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THE IRON TRADE REVIEW

VOLUME XXXII. CLEVELAND, O. MARCH 2, 1899. CHICAGO, ILL. NUMBER 9

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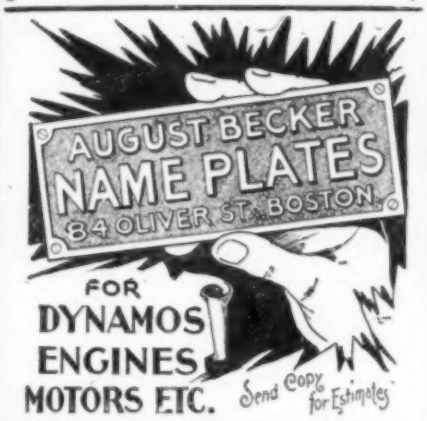

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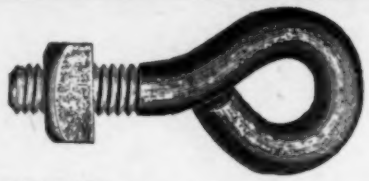

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THE IRON TRADE REVIEW

VOLUME XXXII. CLEVELAND, O. MARCH 2, 1899. CHICAGO, ILL. NUMBER 9

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Advances in iron and steel prices come so thick and so fast that a daily rather than a weekly review would be required to take timely note of all. The important consolidation fact of the week is the organization of the National Steel Co., with an annual output of about 1,750,000 tons of billets and sheet bars from its six Central Western steel plants, and a pig iron capacity of from 1,200,000 to 1,300,00 tons. That it is negotiating for ore supply is quite certain; and it is entirely in the probabilities that its alliance with the American Tin Plate Co. may take on a stronger form later, and that the American Steel & Wire Co. may be another factor in a larger combine. The relation of the impending sheet mill consolidation to the National Steel Co. has not yet developed, but some work has been done. In the past week the whole line of products has moved upward and there is further indication of the present inadequacy of furnaces and mills to cope with the requirements of domestic and foreign trade of the marvelous proportions to which both have come. Yet another week of such advances as those made in the past seven days would put export business out of the question, except at concessions. A noteworthy fact in connection with the export of Alabama pig iron is that foreign requisitions have poured in steadily under the advances thus far made. No. 3 foundry iron sold above $9 Birmingham in the past week. A bouyant market abroad has worked steadily in favor of the export trdae, in the face of the rapid advance at home. The point is being reached at which buyers are becoming more urgent to make contracts for the third quarter of the year, and the month of March is expected to bring some substantial developments respecting the basis on which the business of the second half of the year will be done. Bessemer pig iron went up 50 cents to $12.50 valley furnace under further buying by the leading Pittsurg interest; and on negotiations now under way $13 valley is the minimum. The question now confronting furnacemen is whether, with substantially all the metal sold that can be made between to-day and July 1, they are willing to fix a basis for third quarter sales. The pinch of the shortage in steel has been felt already by certian of the smaller finishing plants, the important producers of billets, with finishing mills of their own requiring an unprecedented tonnage of steel for their rolled products. The purchases of Bessemer iron by Pittsburg interests, coupled with the picking up of odd lots of ore on the docks, are indicative of the general judgment that a shortage is ahead. The course of the foundry iron market in the past ten days has shown that buyers are concerned about their supply of iron for the balance of the year, and the general advance of $1 a ton in that time has only had the effect in some cases of stimulating inquiry in the effort to cover before a higher price is reached. The situation in pig iron is only an index to that which appears through the whole line of products. At Chicago 30,000 tons of structural material was taken in the week's sales and a large tonnage is pending. The structural mills have advanced all shapes $2 a ton, making beams and channels 1.40c Pittsburg, and angles 1.30c. Sheets are about $2 a ton higher, and plates have reached 2c on prompt deliveries. Though the plate mills are making an unprecedented output the situation is not a whit relieved. The new list on pipe and tubes means a further advance, and mills were never so pressed for deliveries. Bars are higher at 1.15c valley mill, for iron, and 1.25c, Pittsburg, for steel. Some earnest work is being done on a bar iron consolidation, but the outcome thus far is not a strong guaranty of success. In the two lines of products in which control by a single organization is quite thorough, advances have been announced within the week—in tin plate 25 cents a box; in wire nails 25 cents a keg, and in wire 25 cents a hundred. The American Steel & Wire Co.'s plants are being pushed to their utmost.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
705 PUBLICATION BUILDING, Feb. 28.

It is now generally accepted that there will be a continued scarcity of material in most lines, and fancy prices are named in a number of cases. All producers are far behind on their deliveries and are making strenuous efforts to keep their customers in a good humor. There is probably less inquiry this week than last because it is being accepted that the material cannot be had. The market is so excited that it is very difficult to name an established price, and the phenomenal advances last week are followed by similar advances this week. There is no likelihood of relief for some time to come at least. A number of finishing mills have been compelled to shut down, or are running to less than their full capacity, not from lack of orders, but from lack of steel. The producers on whom they have counted for their raw material have been enabled to fill their own finishing mills, and have in consequence been selling less in the form of billets.

PIG IRON.—There is probably little over 15,000 tons of valley Bessemer pig iron unsold previous to July 1, while a demand is likely to materialize for many times that amount. Quotations are being made only on small lots, and while some sales have been made at $12.50, valley furnace, as against $12.00 quoted in our last report, the minimum quotation to-day is $12.75, and there is every probability that $13 or $14 will be the ruling figure before the middle of the year. In the Pittsburg district there is scarcely any Bessemer iron to be had, and from $13.10 to $13.50, Pittsburg, has been quoted, and this only on small lots. In mill iron the scarcity is still more pronounced than it was. We quote, however, a sale of 2,500 tons, delivered Pittsburgh, at $12.65. In foundry iron there is a further advance to be recorded, No. 2 being quoted at $12.50 to $12.65. There is scarcely any foundry iron to be had, and the small transactions which are being made represent only special cases. We quote:

Bessemer, valley furnace	$12.75
Bessemer, Pittsburg	13.10 to 13.50
No. 1 Foundry	13.00 to 14.00
No. 2 Foundry	12.50 to 12.65
No. 3 Foundry	11.50 to 12.00
Gray Forge, valley furnace	12.00 to 12.10
Gray Forge, Pittsburg	12.50 to 12.65

STEEL.—The scarcity of billets for deliveries before June has become more pronounced, and nothing below $21 can now be done, while quotations as high as $23 are made. Mills are in any case only endeavoring to take care of their best customers, and many finishing mills are running short time, or are shut down, from a lack of billets. In open-hearth steel almost any price can be secured. We note a sale by a Pittsburg mill at $28, which, however, does not represent the market, the current figures being from $25 to $26.

SHEETS.—There has been a further advance in the price of sheets, and the best figure for No. 28, common, is now 2.20c, while 2.25c is also quoted, and the opinion is expressed that 2.50c will be reached by the middle of the year. In galvanized, there is a somewhat higher range, and we quote 75 and 75 and 5 per cent, with the latter quotation hard to secure.

RAILS AND TRACK MATERIAL.—The rail market is unchanged, and we quote $22 as the minimum price for standard sections. In track material there is a very firm feeling, but there is no change to be noted in quotations, which are as follows: Spikes, 1.50c; track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; links and pins are quoted from 1.35c to 1.40c.

STRUCTURAL MATERIAL.—An advance of $2 a ton all around was made in structural material last week. There is a very good demand and every indication that the coming season will be the best the trade has had for many years. We now quote: Beams and channels, 3 to 15 inches, 1.40c; 18 to 24 inches, 1.50c; tees, 1.45c; zees, 1.40c; and angles, 1.30c; universal mill plates, 1.40c.

PLATES.—There seems to be no let up in the demand for plates. This week the trade is even more active than at last report, and prices have taken another jump. Quoted prices hardly show the strength of the market, as makers could get almost any figure, were they able to deliver the goods. Pittsburg mills are practically out of the market, yet inquiries for quotations continue to pour in. Locomotive builders are particularly urgent in their demands for fire box material. Prices this week are as follows: Tank plate, 1.60c to 1.65c; shell, 1.70c; flange, 1.75c; fire box, 2c and upward.

SPELTER.—Again the spelter market records higher prices, and the demand is apparently increasing. The local figure this week is 6.40c; New York, 6.50c and St. Louis, 6.25c. The zinc market took a backward turn during the week, but subsequently recovered, leaving prices about where they were with high grade ore still $45 per ton, Joplin, Mo., and fancy ores, $1.50 per ton additional.

PIPES AND TUBES.—The new list on pipes and tubes went into effect Feb. 22. The advance on galvanized is considerably more than on black. List prices are so established that one set of discounts applies to large and small sizes and to black and galvanized. This is 60 and six 10's on less than carloads, with no freight allowance. On carloads it is 60 and six 10's and 5, delivered. The demand is still very active and the pressure upon mills for deliveries still keeps up.

IRON AND STEEL SKELP.—The skelp mills are being pushed to their full capacity, but fall considerably behind the demand. Prices have been put up another notch, and we now quote: Grooved iron skelp, 1.27½c to 1.30c; sheared iron skelp, 1.40c to 1.45c, with some sales reported at 1.50c; grooved steel skelp, 1.20c to 1.25c; sheared steel skelp, 1.30c to 1.35c

OLD MATERIAL.—Scrap material is moving very freely out of the yards, and dealers are closely watching for chances to secure melting stock. In this branch the demand is exceedingly strong, and prices are higher. We quote: Melting stock, $12.25 to $12.50; old steel rails, long lengths, $11 to $11.25; cut, $11.50 to $11.75; old iron rails, $15.50; wrought iron scrap, $12.50 net, valley.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, March 1.

The market, with its marvelous strength, is yet in a very unsettled condition. Demand is large for nearly all classes of iron and steel, but furnaces and mills are unable to take all the business offered for immediate delivery, and this has the effect of restricting sales. In the single line of structural material very large sales were made last week. Contracts placed for building and bridge material involve over 30,000 tons, with a number of large deals still to be closed. On every side advances in prices have been made, and there seems to be no top to the market. Further advances are freely predicted for nearly every grade of material.

PIG IRON.—Inquiry for immediate shipment is not large, but buyers who want iron immediately are very insistent, and are perfectly willing to pay sellers' prices to secure the required deliveries. There is very little unsold iron for delivery within the next three months, either North or South. Consumers are asking for prices on their iron for the third quarter and last half of the year, but find the furnaces unwilling to contract their output for so long a time ahead, in most cases. What sales are being made by the furnace agents are conditioned on acceptance by the furnaces. Most of the Southern furnaces are practically out of the market for the next two months, at least, and some for four months. Prices continue to advance, sales having been made, in the past week, on a basis of $14.25 for No. 1 soft iron, Southern; $13.75 for No. 2 foundry, Southern, and $13.50 for No. 2 foundry, Northern. These were all for immediate shipment, but furnaces refuse to quote less than these figures for any delivery, early or late. Quotations are revised as follows:

Lake Sup. Charcoal	$14 00 @ 16 00	Southern Coke No. 3	$13 25 @ 13 75
Local Coke Fdy. No. 1	13 50 @ 14 00	Southern No. 1 Soft	14 00 @ 14 25
Local Coke Fdy. No. 2	13 00 @ 13 50	Southern No. 2 Soft	13 75 @ 14 00
Local Coke Fdy. No. 3	12 50 @ 13 00	Southern Silveries	14 00 @ 14 25
Local Scotch Fdy. No. 1	13 50 @ 14 00	Jackson Co. Silveries	13 50 @ 14 00
Local Scotch Fdy. No. 2	13 00 @ 13 50	Ohio Strong Softeners	13 50 @ 14 00
Local Scotch Fdy. No. 3	12 50 @ 13 00	Alabama Car Wheel	16 25 @ 16 75
Southern Coke No. 1	14 00 @ 14 25	Malleable Bessemer	13 50 @ 14 00
Southern Coke No. 2	13 75 @ 14 00	Coke Bessemer	13 50 @ 14 00

BARS.—Sales of bar iron and steel were large last week, and included several very good sized contracts. Wagon makers are in the market, and have already placed some business, with more to follow. The mills are firmer and firmer in their views every day, and prices are steadily mounting. Several of the mills near by are about sold up for the next few months, and can take only small business to fill in with. Common iron is quoted from 1.20c to 1.35c; soft steel, 1.25c to 1.40c; guaranteed iron, 1.30c to 1.50c. The range is very wide, and mills make prices solely according to their ability to take the business, without regard to what competing mills may be able or willing to do. Sales have been made at the top figures quoted, and it is not at all likely that any mills would accept business at prices under our minimum figures. Some progress has been made in the scheme to combine all the bar iron mills, but nothing is in shape for announcement yet as to what mills are included in the arrangement, or what the chances are for its final success.

RAILS AND TRACK SUPPLIES.—Small sales of rails were made last week. Most of the business booked was for light rails. Quotations are as follows: Standard section rails, $23 to $24; light rails, $21 and upwards; steel splice bars, 1.15c to 1.25c; track bolts with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.55c to 1.60c.

CAR ORDERS.—The E. & T. H. road placed a contract for 500 cars last week, and another Western road is in the market for 500 more. Several smaller contracts were placed in the week. The demand for car material is heavy, and good orders pare laced every week.

BILLETS AND RODS.—No sales of either billets or rods were made in this market last week. Prices are nominally higher, as follows: Axle billets, $24; open-hearth billets, $23.50; Bessemer billets, $22.50; rods, $28.

STRUCTURAL MATERIAL.—Large contracts for building and bridge material were placed here last week, and further business will be placed immediately. Among the orders closed were the contract for the new Merchants' Loan & Trust Bldg. taking 2,400 tons; Schlesinger & Mayer Bldg., 3,000 tons; 10,000 tons of bridge material to one contractor, for work for the Rock Island, the Lake Shore and one other road; 4,000 tons of bridge material to one contractor, for a number of small bridges, and over 10,000 tons of miscellaneous material in small lots of from 100 to 600 or 700 tons each. The Swift warehouse, at the stockyards, recently burned, is to be replaced with a larger building; the Merchants' & Manufacturers' warehouse, burned last week, is also to be replaced; the Tennessee Central road is figuring on work which will take 1,500 tons of material; the Great Northern road will use about 4,000 tons of material, and a number of other projects are expected to be definitely settled in the immediate future. Altogether, the week was the best for a long time past. With all the business going, prices continue to advance, and quotations are higher this week. Beams are quoted $2 higher than

a week ago. Quotations are as follows: Beams, 15 inch and under, 1.55c to 1.60c; 18 inch and over, 1.65c to 1.70c; angles, 1.45c to 1.50c; sheared plates, 1.65c to 1.70c; universal plates, 1.75c to 1.80c; tees, 1.55c to 1.60c; zees, 1.55c to 1.60c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—Sales of plates are still limited only by the capacity of the mills, the demand being as large as ever, if not larger. Sales were made last week of over 3,000 tons by the local mills, deliveries for the third quarter. Considerable business was taken also by outside mills. Quotations have been advanced, and are as follows: Tank plates, 1.65c to 1.70c; flange steel, 1.75c to 1.80c; marine, 1.95c to 2.05c; fire box steel, 2.25c to 4c.

SHEETS.—Sales of both black and galvanized sheets last week were excellent, and the demand shows no signs of a let-up. Most of the mills are sold up for some time ahead, and are not taking additional business. The market is very firm, as a consequence, and prices are higher. Black sheets are selling easily at 2.25c to 2.35c, for No. 27, and galvanized sheets are quoted at 75 and 7½ to 75 and 10 per cent off, with freight allowance.

MERCHANT STEEL.—The demand is fully as large as the mills are able to handle, and in many cases orders have had to be reduced in size before mills could accept the business. Quotations follow: Open-hearth spring, tire and machinery steel, 1.75c to 1.80c; smooth finished machinery steel, 1.60c to 1.70c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7c; specials, 10c and upwards.

WIRE AND WIRE NAILS.—The market is very firm, with prices advanced about 25 cents in the last week. The demand is good, and sales were of fair volume in the week. Wire nails are quoted at $2; painted barb wire, $2.10; galvanized barb wire, $2.50; plain, $1.85, all at Joliet. These are carload prices. Less than carloads are quoted 10 cents higher.

SCRAP.—Dealers find it difficult to secure all the scrap required by consumers, of some grades, at least, and sales have been somewhat limited because of the short supply. Old iron rails are in large demand, and several good sized lots were sold last week. Other grades of scrap are selling well, with some good orders placed. Quotations continue to advance Dealers' selling prices are as follows:

Old iron rails, gross,	$14 50@$15 00	Axles, net	$16 00@$16 25
Old steel rails, long, gr.	10 75@ 11 00	Cast borings, net	4 75@ 5 00
Old steel rails, short	8 75@ 9 00	Wrought turnings, net	7 00@ 7 50
Old wheels, gross	14 00@ 14 50	Axle turnings, net	7 50@ 8 00
Railroad forge, net	14 00@ 14 25	Mixed steel, gross	7 00@ 7 50
Dealer's forge, net	11 50@ 12 00	Stove plates, net	6 25@ 6 50
No. 1 mill, net	8 50@ 9 00	Heavy melting steel, gr.	8 50@ 9 00
Heavy cast, net	10 00@ 10 25	Old iron splice b., net.	14 25@14 75
Malleable cast, net	8 00@ 9 00		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., March 1.

The most important recent development in the ore trade is that referred to briefly last week—the purchase of a large tonnage of ore from Lake Erie docks by the leading Pittsburg interest. The fact that anything bearing the name iron ore was taken in this sweep-up indicates either that the buyer's ore consumption for the year ending May 1 will go beyond expectations, or that every precaution is being taken at this early day against a shortage in the coming ore year. There are some in the ore trade who do not expect to see the full amount of ore sold in the past month shipped from upper lake ports. Between the difficulty experienced in the Lake Superior region for nearly a year, in keeping an adequate labor supply on the iron ranges, and the tax that will be put upon ore roads to handle so large an output, and the interruption in the movement that may be caused, as in the past two seasons, by the inadequate car supply at Lake Erie docks, causing the whole line to back up on the mines—in the possible complications growing out of these conditions, forehanded managers of large interests appear to be providing against contingencies. There have been scattering sales of ore in the past week, and there are still some furnaces whose year's supply has not been fully secured. The advance in mining wages in the Ishpeming district went into effect this week. It is an average of about 10 cents a day per man. Reports from the Lake Superior region indicate unusual activity in prospecting for ore, and properties passed by in the long interval of low prices are getting attention. Deals for the purchase of mines are plentiful and the trade is on the qui vive for changes of ownership.

PIG IRON.—The 40,000-ton purchase of Bessemer iron by the Carnegie Steel Co., last week, at $12, valley furnace, was followed by a 10,000-ton sale to a firm of Pittsburg dealers on the same basis. This week sales of 12,000 tons are reported, the bulk of which was taken by the leading producer at Pittsburg. The price was $12.50, at valley furnace, an advance of 50 cents in the week. It is understood that further business is under negotiation, but it is yet to be determined whether the associated Bessemer furnaces can make further deliveries in the first half of the year. To-day no quotation below $13 valley furnace would be made, it is said, though no iron has been sold at that figure. With inquiries already out for third quarter metal, it is probable that March will see the beginning of business for extended delivery. The sales of the past 10 days have been for immediate delivery. Foundry iron has advanced more rapidly than Bessemer in the week and $12 and $12.50 for Nos. 2 and 1 respectively, are the basis of sales at valley furnace. One sale of 500 tons, April and May, is reported at $12.50 valley furnace for No. 2. Foundries are paying the advanced prices as they come into the market for new iron. As a rule, however, furnaces are selling little beyond July, and buyers who would protect themselves against a further advance are forced to see higher prices established without being able to get under cover. Gray forge is so scarce that few transactions are reported. The price is $12 at valley furnace, and $12.65, Pittsburg, has been done On a small transaction in white iron $11.60 furnace was the basis. We quote f. o. b. Cleveland:

Bessemer	$13 15	Valley Scotch No. 1	$13 15
No. 1 Strong Foundry	13 00@13 25	Valley Scotch No. 2	12 65
No. 2 Strong Foundry	12 50@12 75	Gray Forge, valley	12 00
No. 3 Foundry	12 40@12 65	Lake Superior Charcoal	14 00@15 00

FINISHED MATERIAL.—Prices seem to be valid only from day to day and are on the move in all lines. The new list on pipe is welcomed as simplifying computations, giving one base discount for standard black or galvanized extra strong and double extra strong pipe, namely, 60 per cent and six 10's on less than carloads, with no freight allowance; and on carloads, 60 and six 10's and 5, with freight allowance up to Chicago delivery. The pipe market continues active with a large spring business ahead. Sheets have advanced $1 to $2 further in the week, the Pittsburg quotation for No. 27 being 2.20c to 2.25c. Cleveland sellers quote 2.45c out of stock. On galvanized sheets the mills now quote 75 per cent off, with 15-cent freight allowance. The plate market grows tighter. In the week 2c Cleveland has been paid for one-quarter inch tank steel. Structural material as advanced last week is now on a basis of 1.40c Pittsburg for beams and channels and 1.30c for angles. A contract has been let calling for about 1,000 tons of plates and shapes for sugar house construction, the work being done by the Forest City Steel & Iron Co. Bars have advanced $1 to $2. Valley mills quote 1.15c at mill. Steel bars are now sold on a Pittsburg basis, with the local mill no longer manufacturing, and 1.20c to 1.25c Pittsburg is the quotation. Axles advanced last week from 1.40c to 1.60c base Pittsburg. Wire and wire nails have been advanced 25 cents since last report and every mill of the American Steel & Wire Co., is driven with orders. We quote wire nails at $1.85 Cleveland mill to the jobbing trade; smooth wire, $1.70; painted barb wire, $1.95; galvanized wire, 40 cents additional.

OLD MATERIAL.—There is activity unknown in months and mills and foundries are buying steadily. Prices have advanced almost daily. We quote No. 1 railroad wrought scrap at $14.50; machinery scrap at $9.50 to $10.50; car wheels, $14; old steel rails, $11.25; cast borings, $7 to $7.50; wrought turnings, $8.25; stove plate, $8 net.

LAWRENCE Furnace, at Culbertson, Lawrence Co., O., with office at Ironton, O., met with an accident on Feb. 26, that will necessitate a stop of 30 days for repairs. The entire lower section of the stack gave way, bringing down all the brick work below the mantle, and causing considerable other damage. The furnace is now being shoveled out.

THE Standard Underground Cable Co., Pittsburg, will have a meeting in May to increase the capital stock from $1,000,000 to $1,500,000, to provide for a new site and doubling the capacity. The present plant is at 16th st.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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MARCH 2, 1899.

The National Steel Co.

On Saturday, Feb. 25, formal transfers were made of all but two of the steel plants being taken by the National Steel Co. Monday, Feb. 27, was the last day for payment on the stock as allotted to subscribers; and for several days preceding subscription rights were traded in on a basis representing an advance of fully 25 per cent over their original cost. The transfers of last Saturday were of the Ohio Steel Co., Youngstown, O.; Shenango Valley Steel Co., New Castle, Pa.; Bellaire Steel Co., Bellaire, O.; King, Gilbert & Warner Co., Columbus, O. The transfers of the Aetna-Standard Iron & Steel Co., Bridegport, O., and the Buhl Steel Co., Sharon, Pa., while fully arranged for, are to be made later. The coal properties and the Columbia Iron & Steel Works, recently purchased at Uniontown, Pa., by Henry Wick, of the Ohio Sfeel Co., are to be taken also by the National Steel Co.

The capital of the new company is $59,000,000, of which $27,000,000 is seven per cent preferred stock and $32,000,000 common stock; but as stated last week, the present issue is $22,000,000 preferred and $28,000,000 common. The basis on which the stock of the various companies was purchased represents a handsome advance from their par, being in one case 275 and in another 260. As all the constituent plants have been profitable, some of them conspicuously so, it can be appreciated that the National Steel Co., as an aggregation of money-making properties, occupies a strong position at the outset.

The organization was effected Monday by the election of the following:

President—William E. Reis.

First vice-president—Henry Wick.

Second vice-president—R. M. Gilbert.

Secretary and auditor—William H. Baldwin.

Treasurer—Frederick S. Wheeler.

Executive committee—Chairman, Henry Wick; William E. Reis, R. M. Gilbert, Daniel G. Reid, William B. Leeds, Frederick S. Wheeler, William H. Moore.

Directors—William E. Reis, Henry Wick, William H. Moore, William B. Leeds, Daniel G. Reid, James H. Moore, R. M. Gilbert, James McLean, Warner Arms, J. R. McCortney, Frederick S. Wheeler, Myron C. Wick, William T. Graham, John A. Topping, James B. Dill.

The connections of these officers and the relative representations of officers of the constituent steel companies and of the American Tin Plate Co. will be interesting to note. W. E. Reis has been president of the Shenango Valley Steel Co.; Henry Wick, president of the Ohio Steel Co.; R. M. Gilbert, president of the King Gilbert & Warner Co.; Wm. H. Baldwin, secretary of the Ohio Steel Co.; John A. Topping, president of the Aetna-Standard Iron & Steel Co.; J. R. McCortney, president of the Bellaire Steel Co. Myron C. Wick is president of the Union Iron & Steel Co., Youngstown, and a considerable stockholder in the Ohio Steel Co. His election to the board of directors doubtless signifies that the Union Iron & Steel Co. which is not yet included in the National Steel Co., though that was part of the original plan, will be taken over, new negotiations to that end being under way. This makes six steel manufacturers on the board. Nine members are connected with the American Tin Plate Co.: W. H. Moore and J. H. Moore, the promoters of both companies; W. B. Leeds, chairman; D. G. Reid, president; W. T. Graham, second vice-president Warner Arms, third vice-president; Frederick S. Wheeler, treasurer; James B. Dill, counsel; James McLean, a director, member of the firm of Phelps, Dodge & Co., New York. Of the executive committee, four members are American Tin Plate officers and three are from the component steel companies. The controlling votes on the executive committees of the two companies are in identical hands. The headquarters of the company will be in Chicago, and the removal to that city of Messrs. Reis, Henry Wick, Gilbert and Baldwin is expected.

The blast furnaces of the National Steel Co. will number 10 when the Ohio Steel Co.'s monster stacks are finished. This is apart from the Jefferson Iron Works furnace operated by the Aetna-Standard Iron & Steel Co. under lease. The Bellaire Steel Co. has two stacks, the King, Gilbert & Warner Co. two and the Shenango Valley Steel Co. two. The total output of pig iron will be from 1,200,000 to 1,300,000 tons a year. The capacity of the steel works is considerably more, being about 1,750,000 tons of billets and sheet bars in a year. It has been reported that Rosena Furnace and the Oliver share of the ore of the Oliver Iron Mining Co. would be acquired; but it is settled that such transfer will not be made. The only interest in ore property acquired by the transfers is that of the Ohio Steel Co., in the Biwabik mine on the Mesabi range. This fact gives strong color to the belief that the National Steel Co. is negotiating for the purchase of the Lake Superior Iron Co.'s mines and vessel property. It is intimated that in view of the large amount of steel the National Steel Co. will produce over and above the needs of the American Tin Plate Co.'s mills, and the sheet mills that may come together in an allied consolidation, a merger of the new steel company and of the American Steel & Wire Co. is not an improbable development of the near future. The American Steel & Wire Co. has but five blast furnaces with a total annual output of about 550,000 tons. Its steel making capacity at the Cleveland Rolling Mill Co. and Oliver & Snyder Co. plants is about the same. With an annual product of 1,200,000 tons of rods, wire and nails, it will be a buyer of nearly 700,000 tons of rods and billets. Of the steel heretofore purchased for the American Steel & Wire Co.'s mills in the Central West much has come from three of the plants now owned by the National Steel Co.

It has been evident for some time that the amalgamation of the American Steel & Wire Co. and the Federal Steel Co., much talked about some months ago, would not take place. But even under a merger of National Steel Co. and American Steel & Wire Co. interests, it is probable that the Illinois plants of the American Steel & Wire Co. would be buyers of rods and billets from the Federal Steel Co.

Of the 400,000 to 450,000 tons of sheet bars which the American Tin Plate Co.'s plants will require each year, the National Steel Co., it is presumed, will only furnish a portion in the next five years, in view of the five-year contract of the American Tin Plate Co. for 150,000 tons of sheet bars a year from the Carnegie Steel Co., and, presumably, an arrangement for a certain annual tonnage from the Federal Steel Co.

NOTICES have been posted at New Castle, Pa., at the plant transferred Saturday last from the Shenango Valley Steel Co. to the National Steel Co., announcing advances in wages all around. Employes receiving $1.50 or less per day have an advance of 10 per cent; from $1.50 to $2, 7½ per cent, and from $2 to $2.50, five per cent.

PERSONAL.

John W. Seaver, of the Wellman-Seaver Engineering Co., Cleveland, has returned from a European trip.

President A. J. Moxham, of the Lorain Steel Co., will make a trip to England the coming spring.

W. H. Singer, for many years a member of the board of managers of the Carnegie Steel Co., Ltd., has resigned and is succeeded by Thos. Morrison, general superintendent of the Edgar Thomson steel works and furnaces. H. M. Curry, who has been in California for some months, has resigned from the board until such time as his health will permit him to take his place again. James Gayley has been elected to the board to serve in Mr. Curry's absence.

James Horton, of Cleveland, has been appointed superintendent of construction of the new 48-inch mill now being erected at the Homestead Steel Works.

Francis O. Wether, who for some years superintended the operation of the Pottsville Iron & Steel Co.'s plant at Fishback, Pa., and lately engaged at Middleborough, Ky., has accepted a position with the Burgess Steel & Iron Works, Portsmouth, O.

S. S. Knight has again taken charge of the chemical laboratory of the Addyston Pipe & Steel Co., Cincinnati, succeeding L. W. Bozart.

I. A. Kelly, president of the Ashland Steel Co., Inc , has removed his residence from Ironton, O., to Ashland, Ky.

Prof. J. B. Johnson, the newly elected dean of the College of Engineering, Madison, Wis., assumed his new duties last week, going from St. Louis, where he has been for several years, at the head of the engineering department of Washington University. The board of regents at Madison have granted him leave of absence, beginning April 1, for study abroad.

E. A. S C. Clarke has been appointed general manager of the Illinois Steel Co., vice W. R. Walker, resigned. Mr. Clarke has been general superintendent of the South Works of the company for the past five years, and previous to that was assistant superintendent of the Union Works. He has been connected with the company for 12 years.

Guy R. Johnson, who has been for several years general manager of the Embreville Iron Co., Ltd., Embreville, Tenn , has been appointed superintendent of the two furnaces the Ohio Steel Co. is building at Youngstown, O. As we have noted heretofore, these will be the largest furnaces in the world.

L. T. Upton, superintendent of the Bessemer departmen: of the Duquesne Steel Works, has resigned. Mr Upton has been in the service of the Carnegie Steel Co. for 23 years. Upon being relieved he will take a vacation for the benefit of his health.

James G. Caldwell, president of the Birmingham Rolling Mill Co., Birmingham, Ala , and S. J. Llewellyn, of the Inland Forge & Iron Co., Chicago, are named by local papers, as having recently made an inspection of various rolling mill plants at Youngstown.

E. P. Mooney has been engaged by the Chicago Pneumatic Tool Co. to represent it in New York.

Chas. Davis, who gave up active work in the American Tool Works Co., of Cincinnati, some months ago, is in Colorado. His health is improved, but it is probable that he will be compelled to remain there, if he engages in business again.

President Alex. Gordon, of the Niles Tool Works Co., Hamilton, O., sailed last week for Europe. He will superintend the construction of the immense plant which is being erected in the suburbs of Berlin, as a German branch of the Niles Tool Works Co.

Joseph D. Fraser, superintendent of the Nova Scotia Steel Co., Ltd., of Ferrona, N. S., was in Pittsburg this week, and will go to Alabama next. He states that the general activity in the iron and steel business has extended to Nova Scotia, and a company is to be organized to build ships at Cape Breton. The Nova Scotia Steel Co. is developing iron ore mines recently located in Newfoundland, and ore is being shipped by an all-water route to the Maryland Steel Co , at Sparrow's Point, Md.

OBITUARY.

Col. Arthur L. Conger, one of the most prominent of Central Western manufacturers, for most of the past 30 years a resident of Akron, O., died at Des Moines, Ia., Feb. 25, aged 61 years. He had been at Kirkwood, Mo., and later at Des Moines for about 18 months, under treatment, having suffered a stroke of paralysis while on a trip to Boston in 1897. Col. Conger's prominence as a manufacturer and man of affairs dates from 1870 when he became a director of the Whitman & Barnes Mfg. Co , of Fitchburg, Mass., and Akron, O., the company manufacturing mower and reaper knives, guards, and other specialties In 1876 he became the vice-president of the company and later its president, holding the latter office nearly 20 years. The growth of the business was phenomenal, and factories were erected at Syracuse, N. Y., St. Catherines, Ont. and Canton, O. A few years ago the great works near Chicago were added. Though in the height of his prosperity easily a millionaire, Col. Conger met with disaster in some of his investments in the years following 1893, and practically lost all his fortune. He was president of the American Tin Plate Co., in 1891, and of the Akron Steam Forge Co. He was a prominent holder for a time in the American Strawboard Co. and in the Diamond Plate Glass Co. and had large investments in land companies in the Indiana Gas Belt. At one time he was president of the National Association of Implement Manufacturers and in the early '90's all but succeeded in forming a consolidation of leading manufacturers of mowers and reapers. He was prominent in Republican politics, being for a number of years Ohio member of the Republican National Committee. His intense application to his large business interests and the strain of the depression of 1893-97, brought the final collapse of his physical powers. In his best days Col Conger was a masterly organizer of business and conspicuously successful in every enterprise to which he addressed himself. To have loaded himself with the care of outside interests just before the severest strain the business and finances of the country have ever known, was a mistake his friends have not ceased to deplore.

Geo. O. Baslington, general manager of the Chapin Bolt & Nut Co., Cleveland, died on Feb. 26, aged 67 years.

C. B. Isbester, of Chattanooga, Tenn., vice-president of the Chattanooga Foundry & Pipe Works, died Feb. 17, aged 70 years. He lived in Pittsburg and Allegheny in the '40's, and learned the pattern maker's trade. In 1852 he went south and engaged in the foundry business in 1868.

Deals for Lake Superior Iron Mines.

In addition to the negotiations for the Lake Superior Iron Co.'s mining and vessel property, which are now more generally credited to the National Steel Co. than to the other interests mentioned in the same connection, there are deals pending for the purchase of lesser properties, and some have been closed. The Mikado mine at Bessemer, Mich., an the Gogebic range has been purchased by the Pittsburg & Lake Angeline Iron Co. Capt. John Sincox, who has been employed in an official capacity at the Lake Angeline mine for many years past, will soon take charge of mining work at the Mikado, with Thomas Walters, superintendent of the Lake Angeline, as general superintendent. Plans for an extensive exploration of the new possession are now being formed.

The Florence mine and all other property of the Florence Iron River Co., including over 4,000 acres of land in Forest county, were sold at public auction by Receiver Beattie, Feb. 28. The only bidder was R. C. Flannigan, representing Ernest Thalmann, of New York. The mine, including a three-quarter interest in the fee and the leasehold of the remaining one-quarter of 400 acres, was sold to Ernest Thalmann for $70,000. The superintendent's residence property brought $1,500; 400 acres of land $3,000, 4,400 acres of Forest county land, $21,000, mine buildings, $18,000, mine machinery $32,000, mining supplies $21,000; total, $166,000. All were knocked down to Mr. Thalmann , who is one of the heaviest creditors. It is expected that the receiver will be discharged about March 15, and mining operations resume.d

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The Jefferson Iron Works property, at Steubenville, O., was sold on Monday, to D. J. Sinclair and others, said to represent the La Belle Iron Works, for $127,700.

LAKE SUPERIOR METHODS OF IRON MINING.*

BY DR. NELSON P. HULST.

The iron ores of this region are mined in the States of Michigan, Wisconsin and Minnesota. There are six mining districts in the region, generally called ranges. They have that name from the fact that very generally the ore bodies occur in or along chains of hills. In general, the trend of these different ranges does not vary much from an east-west course. Each range furnishes ore peculiar to itself, and different portions of the same range have their characteristic ores. Any person well acquainted with the several ranges could, by an inspection of stockpiles of their ore in any district, quite unerringly name the mines whence many of the ores were obtained. Naming the ranges in the order of their birth, i. e., their commercial birth, they are the Marquette and Menominee, of Michigan; the Gogebic, of Wisconsin and Michigan, and the Vermillion and Mesabi, of Minnesota. The Marquette range began producing ore in 1846 on a very limited scale. For the interval up to 1855 it is credited with an output of about 30,000 tons, all of which was consumed in the local forges of the district. In that early period of its history, only the rich, hard ores were considered worth mining The soft, hematite ores of the district were known, but they were entirely neglected until about 1870. In that year the soft ores near Negaunee were somewhat developed, but in a very small way as compared with the hard ore mines of the district. Out of a total output of 860,000 tons in 1870, considerably less than one per cent was soft ores. All the early mines of the Marquette range were opened on outcrops of the hard, high grade ores. They began as quarries, and with good judgment, since open pit mining, under certain conditions, is by far the most economical. Altogether the most satisfactory account of the early mining on the Marquette range is found in Chapter IX. of Vol. I, of the Geological Survey of Michigan. This article, written by Maj. T. B. Brooks, the State Geologist at the time, is entitled, "Method and Cost of Mining Magnetic and Specular Ores." It was written about 1870. It represents the condition of the mining art on the Marquette range at that time. It is probable that there had been but little advance over the methods in use when the range was first opened up in 1846. Maj. Brooks states:

"The iron ores of the Marquette region are mostly extracted in open excavation. Several attempts have been made at underground work, which have not, on the whole been successful. The Edwards mine, opened in 1866, has been almost entirely wrought by candle-light. One pit of the New England mine was thus wrought in 1866, and at about the same time the pioneer pit, of the Jackson mine, was in part worked underground. The Champion mine, in 1868, was opened systematically as an underground mine. In 1870 this underground mining at the Champion was practically abandoned, and the greater part of the ore at that time was taken out from open pits. The Cleveland mine about this time began to mine considerable ore underground. Several other mines, up to that time, had worked underground stopes, but only temporarily. If such stopes could not be opened out to daylight, they were usually abandoned. In brief, it may be said that no considerable amount of ore had, up to 1870, been extracted from underground on the Marquette range, and of that so mined, very little had been taken out at a profit."

Maj. Brooks gives as a reason for the unprofitableness of underground mining "the great width of the ore bodies, often 55 feet, making ordinary timbering difficult, if not practically impossible. The changing dip of the hanging from horizontal to vertical, sometimes occurring, interrupted any systematic plan of mining the ore." Thus quarry-work, started in the infancy of mining in this district, was clung to because of its simplicity. It was "convenient and economical to back a cart directly to the miner's hands, and this was done until it came to be regarded as the way to get out ore."

The shallow ore quarries of the early day had gradually become deeper, and by 1870 some of them were more than 100 feet deep. The necessary roadways for horses and carts or sleighs were cut out, at great expense, from the precipitous walls around which they circled. Sometimes the grades were 10 per cent, and the cost of thus handling the ore, from the working-faces at that depth to the surface, was from 25c to 30c per ton. Up to 1870 and somewhat later, hand drilling was almost universal. Burleigh power drills were given a trial about this time in some of the mines. Their great weight made them unwieldly. This, with lack of skill to operate them, soon barred them from use. The Rand drill, lighter in weight and of better mechanical construction, soon followed and rapidly gained favor.

In 1869 high explosives were first used in the district. Nitro-glycerine at that time cost $1.50 per pound Its economy as an explosive was due in a measure to the fact that the ore broken by it was thrown down in smaller fragments. Expensive block-holing was in a measure thereby avoided. Further economy came by its use in wet holes, which grew more frequent as the open pits gained in depth. Compared with black powder in short holes, three to six feet deep, the nitro-glycerine was more effective by breaking a greater tonnage, which compensated the greater cost of it. Black powder, at the same time, cost from $3.75 to $4 50 per keg of 25 pounds. Drill steel cost then 20c per pound. With open pit mining heavy blasts from high stopes were permitted. Drill holes sometimes 22 feet deep were sunk in the stopes. Sand blasts were used to crack these deep holes at the bottom, until a space was secured for a heavy charge of black powder, of 25 to 30 kegs Occasionally, 5,000 tons of ore were thus thrown down. The slow burning black powder in such cases broke down the stope in large masses, which required repeated block-hole charges to break them to sizes required for handling. As the work of quarrying the ore gradually deepened the pits, they reached depths after a while which prevented the use of roadways and carts. Swing derricks were then substituted and horse whims were used to operate them. In some cases steam engine hoists were used to operate the derricks.

Hoists had been recently installed, i. e., about 1870, for lifting skips through shafts and Cornish pumps were the usual means of raising water when buckets were not used for bailing it. At this time not much more than half the ore product of the district was handled by steam (if the rock handled be included, far less than half was moved by steam), the balance was handled by horses and carts. Maj. Brooks comments severely on this large use of the expensive horse and cart method of handling ore, and prophesies "that if there ever comes a period when our mines do not pay, it may be due largely to horses" and he complainingly asks: "In this age of steam, has a business any just right to prosper which employs horses to do work that can be more cheaply done by machinery?" The manual labor of the mines was almost entirely done on contract. The contractors received from 60c to $1.60 per ton of ore, with sometimes an allowance for rock. When the ore was exceptionally hard, requiring also block-holing and reblasting, the cost for explosives reached 50c per ton. The average cost of producing hard ore in the Marquette district in 1870 was estimated by Maj. Brooks on the best data he could obtain, to be per ton, ... $2.64

To this he adds royalty, ...	.50
Commission, interest, exchange, insurance and expense of general office, ...	.36
	$3 50

The mine owners and mine superintendents of 1870 suffered much anxiety as they saw their mines getting deeper, more difficult and more expensive to operate. The unsolved problem of getting ore economically by underground work was forcing itself into consideration as a necessity of the near future. Maj Brooks evidently voiced the feeling that was then abroad when in 1870 he wrote:

"The transition from the present system of quarrying to the future method of underground mining which will have to be made in this region, will be a critical period and will present great interest as affording a solution of a mining problem, such as may not have yet been presented anywhere. Attempts at its solution have already been made, but as has been remarked, very little ore has been extracted at a profit underground. Now, when we consider that the dressed ore is expected to yield 65 per cent in the furnace and is not worth at this time, 1870, on the average over $4 or $5 per gross ton

* Read before the Engineers' Society of Western Pennsylvania, at Pittsburg, Feb. 21, 1899.

on cars at the mine including royalty, the general character of the problem will be understood."

It was at this period that a new order of things was beginning for the region. Bessemer steel manufacture had been recently established in our country and the metal supply for it required the best ores of this region. The iron industry was also rapidly expanded, especially in Western Pennsylvania, Ohio, and at points on the Great Lakes, by reason of the improved transportation facilities connecting them with the new mines of Lake Superior. In consequence the ore production of this region bounded up from 297,000 tons in 1866 to almost 900,000 tons in 1870, an increase of 300 per cent. This greatly enlarged output came for the most part from the old first opened mines of the district. Of necessity, the increased demands for ore from them brought an end to quarry and horse and cart work in their deepest pits. Steam engines for the work began to be installed and we find in 1870 a dozen engines in operation, none of which, however, were larger than 50 horse power.

Fortunately for the transition from open pit to underground mining, the selling price of ores at the time was exceptionally high. Having greater value, the costly experience of winning them was less of a burden to the producer. Shafts were sunk on the underlay and quite invariably in the ore body. This necessitated pillars of ore being left as a protection to them. The usual distance between shafts was from 200 to 250 feet. Levels were made 60 feet apart. Underhand stoping was the prevailing method. The width of the ore bodies was considered a bar to any different method. One and a half to two tons of ore was a skip load. When possible, the skips dumped directly into pockets whence the ore was loaded into railroad cars or else they dumped into surface tram cars which were quite invariably pushed by hand over a trestle to the stockpile grounds.

The high selling price of ores, together with the annually increasing demand, greatly stimulated their production. The percentage of increase was greatest with the soft ores of the region. As was noticed in the earlier part of this article, the production of soft ore in 1870 constituted less than one per cent of the product of the region for that year. In 1880 the product of the soft ores of the Lake Superior region was almost 45 per cent of the total output. The rapid development of the soft ore mines, which by their continually increasing product have constantly glutted the market, has been the factor most potent of all to bring about the gradual decrease in ore prices. As a consequence greater skill in mining and producing the hard ores has become necessary in order to meet the falling values.

Economy in producing them has come in many directions. Larger tonnage per shaft and fewer shafts now are noticeable. Shafts are located very generally in foot wall rocks. Thus placed they require the least amount of repairs and a tying up of ore in pillars for their protection is avoided. High grade engines for hoisting, pumping and air compression have been installed at most of the hard ore mines and hoisting in balance is generally in use. At some of the mines four and five tons of ore are hoisted to a skip load. Larger use of power drills is made, and in very hard ores, as at the Soudan mines on the Vermillion range, the diamond drill is used for drilling in stopes by reason of its economy over percussion power drills for that purpose. The drilling cost by diamond drill is actually greater, but greater tonnage for the same dilling is broken by their use. Tramming power is found in a number of the mines. In order to avoid delays in loading skips at levles, pockets for ore connecting with the shaft are arranged on different levels. Everywhere at these mines studied efforts have been made and are being made to reduce the amount of manual labor to the smallest minimum, since labor is one of the largest items in the cost of mining.

[To be continued.]

ROGERS, BROWN & Co., whose purchase of the plant and business of the Iroquois Furnace Co., Chicago, was noted in these columns lately, take possession of the Iroquois furnace March 1. It is the intention of the new owners to make considerable improvements in the furnace plant, and within a short time work will be commenced on a new stack, of large size and modern in every respect. This will make the plant consist of two stacks.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Pittsburg Foundrymen's Association was held on Monday evening last. The usual routine business was transacted, and the committee on the reception of the national organization in convention next May reported that sub-committees had been appointed and that considerable work would have to be done by the members of the association outside of those actually on committees.

An interesting exhibit of test bars was presented. The set was one of those made for the committee of the American Foundrymen's Association on standardizing the testing of cast iron, and was cast by Thos. D. West, of a soft Bessemer or ingot mold iron. The whole tset, embracing round and square bars of a great variety of sizes, was cast at one time.

The principal feature of the evening was the address by Mr. Walter Kennedy, who has recently returned from China, where he was engaged for some time by the government in connection with their steel works and rolling mill. Mr. Kennedy was scheduled to speak on "Chinese Foundry Practice," but he showed that this was an unknown quantity, and devoted most of the time to a general description of his experiences in China. Only an abstract of Mr. Kennedy's very interesting address can be given. His first experience was with apparatus being run as a blast furnace. There is scarcely any distinction in China between a blast furnace and a cupola. This blast furnace was about 12 feet high, built on a hillside, and shaped like the frustum of a pyramid. There were two tuyeres, and the blast was furnished by a feather-packed piston working in a box about 20 inches square, and operated by 18 men, who took turns, one at a time. The cast amounted to about 60 pounds. Mr. Kennedy's next experience was with an affair which had been built for a cupola, but was being used as a blast furnace, using ore and scrap. It was about five feet high, with one tuyere, the cast being between 25 and 30 pounds. At this place they were making kettle castings, which were of very fine quality, the thickness being not over an eighth of an inch, while the kettle was about 30 inches in diameter. At another place, the cupola was in three stories, having a total height of about eight feet. The sections were bolted together, and the bottom one was used as a ladle. When enough iron had accumulated in the bottom part, the two top parts were taken off and the bottom used as a ladle. The labor employed at all these places was the cheapest and most ignorant.

Mr. Kennedy first went to China at the instance of Calvin S. Brice, to make an estimate on the cost and feasibility of building a railroad from Han Kau to Pekin. This project fell through, and he was then employed by the Chinese government in connection with the government iron works. While he had 16 titles at one time, he was not permitted to hire or discharge a single man, this being reserved for the Chinese officials, who levied tribute on all the employes, those who would surrender the greatest part of their earnings being thus in favor, so that the class of labor employed in the iron works was the very worst there was. In six years they had made about 300 tons of rails, and there was little chance of doing any better until by a dint of effort Mr. Kennedy succeeded in securing actual authority to run the works as he desired. Then they made about 3,000 tons in eight months, but as soon as any department showed any signs of running properly, it was desired to turn it over to the Chinese officials.

There was in the government works a great deal of fine machinery, which had been ordered from England, Germany and elsewhere, but much of it they had no knowledge of, and some machines had been put together by ignorant coolies, with the result that gears which should mesh were sometimes several inches apart. The first department gotten in shape was the rail mill. When they succeeded in making 10 rails a day—about five tons—it was considered a great achievement, and when the production got up to 60 tons, the officials were highly satisfied and wanted the bar mill put in operation to make splice bars, etc. Finally there were seven departments gotten in running order.

The whole Chinese system is such that there is little opportunity for American skill and enterprise, because the authority must rest in the officials, who frequently pay for the

privilege of holding positions in which they can extort money from the laborers, and the works are filled with the laborers who will pay the greatest tribute, while as soon as the officials think they have learned how to do anything, they at once want to do it themselves, generally with disastrous results.

The Cincinnati Iron Market.

Feb. 28.

Matthew, Addy & Co. make the following comment on the situation in pig iron: "Unless one has actually been in the South it is hard to realize the full strength of the situation there. In fact, it must be seen and felt to be thoroughly appreciated. Briefly stated, every furnace south of the Ohio River is sold ahead for from five to six months. They are all behindhand on deliveries and no furnace has any stock of iron on hand. For instance, the largest furnace company in the South has less than three days' make in its yards. Another one of the very large companies, which ordinarily carries from 8,000 to 12,000 tons on hand as a reserve for safety, had only one carload piled up and that was white iron. A visitor to this furnace jokingly told the president of the company that he would give him $500 for the iron on the yard. This was before he had seen the absolutely depleted condition of the yard. As soon as he saw the bare spaces that were formerly well piled with iron, he hastened to withdraw his offer. In the face of these conditions there is a steady demand for iron. It is apparent that many of the very largest consumers of foundry pig iron and of mill iron are either not fully supplied for the first six months of this year or else are becoming too nervous over the situation to take their chances longer, for they are now endeavoring to contract for their pig iron for the balance of the year. Naturally, prices are going up with leaps and bounds. At the beginning of last week $10 for No. 2 foundry iron, cash, f. o. b. cars Birmingham seemed an impossible price. This week the price is firmly established and there is no reason to believe that it will stay at $10 long. In fact, there is every reason to believe that quotations will necessarily continue advancing. The situation is such that no quotations are being made except for acceptance on the spot. Sales agents are afraid to leave quotations open over night, for prices that were perfectly good yesterday may possibly by to-morrow be clear in the rear. It has been years since there has been such a bull market and it is a bull market not based on sentiment, but with the hard and fast statistics of the situation to back it. One remarkable feature should be noted and that is that the foreigners have been buying iron right along with the market. Last week sales were made of No. 3 foundry for export above $9, showing conclusively that Europe is not merely the dumping ground of the cheap-priced surplus, but that consumers there want the American iron and are willing to pay the full American prices for it. At present the greater part of the iron being exported while bought by Englishmen, is going to the continent, although a large proportion is used in Great Britain." Among domestic business recently are considerable sales of Lake Superior charcoal iron to malleable works. The car works combination has postponed purchases for car wheels for a little. We change quotations to the following, f. o. b. Cincinnati: Southern coke, No. 1 foundry, $13 to $13.25; No. 2, $12.50 to $12.75; No. 3, $12 to $12.25; No. 4 and gray forge, $11.50 to $11.75; mottled, $11.50 to $11.75; No. 1 soft, $13 to $13.25; No. 2 soft, $12.50 to $12.75; Hanging Rock charcoal, No 1, $16 to $17; Jackson Co. silvery, No. 1, $13.25 to $13 50; standard Georgia car wheel, $14.75 to $15.75; Hinkle Lake Superior charcoal, $14.75 to $15.

PITTSBURG councils on Monday passed an ordinance vacating portions of six streets on the South Side, Pittsburg, to connect land of Jones & Laughlins, Ltd., on which certain improvements will be made, including the two continuous mills for rolling bar steel. An ordinance was passed by Common council, but held over for a month by Select council, vacating portions of six alleys and streets in the Lawrenceville district, to permit of extensions to the Keystone Bridge Works of the Carnegie Steel Co., Ltd. It was stated in the meeting that the number of employes at the Keystone plant would be increased, by the proposed enlargements, from 700 to between 1,500 and 1,700.

THE OUTLOOK FOR PIG IRON PRODUCTION.

The views of Archer Brown, of New York, resident partner of Rogers, Brown & Co., are given to the New York *Times* in the following form, relative to the status and prospects of pig iron production and demand in the United States:

"The situation in pig iron has reached a stage of excitement. Not since the memorable boom in iron of 1879-80 have the conditions resembled those of to-day. During the interval of 20 years we have had brief spells of improvement in the market and several times prices have risen much higher than the rise of the past few weeks, but in none of the previous seasons of improvement were there the solid conditions at the foundation of the industry that we see to-day. In 1895 there was a spurt which took prices up two or three dollars higher than they are to-day, but it was a speculative movement. The country was not ready for it, and it flattened out, leaving the trade in worse shape than it was before. Now there is a complete absence of speculation, but a legitimate demand for actual consumption that is outrunning the capacity of the furnaces of the country. No intelligent iron now man doubts the genuineness or permanent character of this demand.

"Several fallacies exist in quarters usually well informed. One of them is that as prices of iron advance fires will be lighted in idle furnaces, and this operation will continue until the reviving demand is smothered under an excess of output and prices will drop again. This view might hold if the blast furnace was the only factor in the problem, but back of the blast furnace must be raw materials—ore and coke. The ore mines from Lake Superior to Alabama are now taxed to their utmost capacity, and an additional supply equal to the requirements of one out of a dozen of the idle furnaces is out of the question for the present. If good times continue, capital will be attracted, and there will be a further development of ore properties, but many months must elapse before this factor can be felt.

"Much the same situation holds in fuel. In the Birmingham district there are plenty of idle furnaces but not one of them can be started because the coke supply is scarcely adequate to the needs of those now running. The enormous demand and enhanced prices for coal make it more profitable for the large companies like the Tennessee Coal & Iron Co. and Sloss Co. to take care of their coal trade rather than divert the excess product of the mines to iron. In the Connellsville district nearly the entire available capacity of the ovens is active and the product sold well ahead. There is some reserve capacity in the Pocahontas field in Virginia, but until further ovens are built it will not cut much figure.

"It is well known that the year's product of non-Bessemer ores of the Lake Superior district were sold in a single week about a month ago, and that furnaces depending on lake supply will have a rocky time in securing ores to run on if they have not yet covered.

"In a general way, therefore, it may be said that no large increase of production of non-Bessemer iron may be looked for in the next few months, but that a continuance of the present conditions will slowly expand our make. The United States will have an opportunity in the next 12 months to test its full vigor as a producer of pig in the world's markets. We are now making about 12,500,000 tons a year. We can probably add another million tons under the stimulus of a strong demand, but when it comes to the second and third million to be added, reaching the 15,000,000 ton mark which has been set for us, there must be a large infusion of new capital into development of mines, railroads, lake steamers, and blast furnaces. Capital is still timid about such ventures, remembering the severe lessons since 1893, but when sentiment changes things will go with a rush.

"The effect of this situation on the industrial field of the South is very marked. The Birmingham companies have sold their product far ahead at profitable figures. It is safe to say that not one-third of the product of the Alabama district is available to sell for delivery before Jan. 1, 1900. In Virginia, which has been a peculiarly unfortunate field in iron matters, the new consolidation of furnaces and mines, under the title of thee Virginia Iron, Coal & Coke Co., is likely to introduce a new era of prosperity. Under able generalship, the best-located mines and furnaces have been acquired, and, with financial backing of the highest character in New York, the avoidance of foolish competition that has prevailed between furnaces in the past, and the development of the properties to the highest degree of efficiency by modern processes and ample capital, there is no question but that Virginia will soon take its place as one of the important iron districts of the United States."

Review of the Technical Press.

BY DR. RICHARD MOLDENKE.

High Silicon Irons.—*Engineering and Mining Journal*, Feb. 18th, abstracts a paper by G. de Chalmot, appearing in the *American Journal of Chemistry*. It has been found impossible to increase the silicon in irons made in the blast furnace much beyond the 13 per cent limit. With the electric furnace, however, no difficulty is experienced to make ferro-silicons run up to 50 per cent. If more than 50 per cent of silicon is made to enter the iron it will not combine chemically but crystallize out in a free state in the shape of small black crystals. There seem to be two distinct compounds of silicon with iron, $Fe_2 Si_2$ with 25 per cent silicon, and $Fe Si_2$ with 50 per cent. If a 28 per cent ferro-silicon is cooled slowly from the liquid state large crystals of the first named variety will form, some with edges one-half inch long. These iron silicides are always crystalline, are white or grayish, take a high polish and resemble silver. The 26 per cent ferro-silicons can be melted in a crucible in the brass furnace, though at a higher heat. Ferro-silicons with higher percentages require the electric furnace. If melted in the cupola the silicon burns away rapidly and much is lost; thus a 27 per cent lot lost 5 per cent in the remelting. If cast in molds there is a great tendency to crack, and with high percentages of silicon blow holes also make their appearance. The high ferro-silicons are not readily attacked by acids, hydrofluoric acid aloned excepted; they do not show magnetic properties to any great extent. In making ferro-silicons in the electric furnace the materials used are finely powdered iron ore, sand and coke dust. The process is a continuous one, and requires but 150 horse power. The alloy collects in the bottom in a pool and is tapped regularly. The low silicon irons thus made are excellent for ornamental work, statuary, etc., for the metal when polished retains its beautiful lustre. The higher grade ferro-silicons crush easily but are very hard, hence can be readily used as abrasives.

American Screw Co.

At the annual meeting of the American Screw Co., at Providence, Feb. 14, President Edwin G. Angell declined to serve on the board of directors in view of the fact that the opposition contingent had control of proxies of a majority of the stock. A new board was elected consisting of Clark Thurston, Charles B. Humphries, Henry C. Bangs, Charles Alexander and Herbert J. Wells. The stock of the company is $3,250,000. The net loss of the year was shown to be $3,341. The total assets are $4,002,996; total liabilities, $3,747,523; surplus, $255,472. Commenting on the pool, President Angell said, in addressing the meeting: "The existing screw pool not only greatly restricts our business and will afford little profit—less than we could probably secure by running independently—but, in addition it has already greatly stimulated competition, and as in former experience we will have less employment for our equipment as time goes on. The question may fairly be asked, why we joined a pool, and my answer to this is that encouragement was given to competitors with reference to pooling arrangements not generally known to all of our board, and when it was found that our competitors acted upon this in entirely good faith it was thought best not to object to joining the pool for a limited time until the situation could be better understood and appreciated."

Warrant Iron in Demand.

The steady decline in warrant yard stocks of pig iron in the United States has been a feature of market news for some time. At New York it is reported that a prominent director of the Tennessee Coal, Iron & Railroad Co., who has held for some years past some 20,000 tons of iron in warrants at Birmingham, within the past two days has made sales of the entire block of iron, the purchaser of these warrants being, it is said, the Tennessee Coal, Iron & Railroad Co. Both the Tennessee and Sloss companies for some time have had orders in New York for the purchase of warrants. A block of warrant iron held in New York for the last 10 years sold recently on the basis of $9 a ton for No. 2 foundry, Birmingham.

BLAST FURNACE GAS ENGINES AT SERAING.

In our issue of Feb. 16 was printed a communication from Mr. A. Bement, of Chicago, which questioned the statement in a recent letter written from Belgium to *The Iron Trade Review* by Mr. J. H. Cremer. Mr. Bement wrote that instead of being of 500 h. p., the gas engines running on blast furnace gas, at the Cockerill works, Seraing, Belgium, were of but 200 h. p., and that the average effective work was 181 h. p., with the suppression of more than a tenth of the admissions. These data we find in the paper of Aime Witz, on "Experiments made with a Motor Using Blast and Furnace Gas," read at the Stockholm meeting of the Iron and Steel Institute in August, 1898. We have just received Vol. II., 1898, of the *Journal* of the Institute and in connection with this paper is the following editorial note:

"This paper embodies the report of experiments with a blast furnace gas engine of 200 h. p., made at Seraing, which was promised by Mr. Greiner at the last meeting of the Institute. The experiments were made by a prominent expert, Mr. Witz, of Lille, France, and show that the consumption of gas, which was expected to be about 4 cubic meters per effective horse-power, was not more than 3.329 (115 cubic feet) after 24 hours' continuous trial, showing the immense benefit derived from the direct use of blast furnace gas in engines. These very interesting results induced the Société Cockerill to decide to build a 500 h. p. blowing engine."

This purpose was carried out, and we are informed that the Cockerill company built not only one but two 500-h. p. gas engines, which were seen in operation by Mr. Cremer on the occasion of the visit of which he wrote to *The Iron Trade Review*. We have it on good authority, moreover, that the Cockerill company is planning to build a 1,000 h. p. gas engine which will be run on blast furnace gas.

The Pittsburg Horse Shoe Co.

The Pittsburg Horse Shoe Co., Ferguson Bldg., Pittsburg, which was incorporated early in January, has just arranged finally for a site for the plant. A tract of about six acres has been secured through Black & Goninger, in a very favorable location in Glassport, a town 18 miles from Pittsburg, on the South division of the Pittsburg & Lake Erie, formerly known as the Pittsburg, McKeesport & Youghiogheny. The land borders on the Monongahela River, affording also excellent water shipping facilities. It is probable that fuel gas from the by-product coke oven plant at Glassport will be used as fuel. Coke of a suitable quality can be obtained also very cheaply from the same source, and coal can be landed at a very low cost. The plant at the start will contain six sets of horse shoe machines, which have been contracted for. The main building will be about 250x110 feet, of steel construction, and will contain the horse shoe machinery and the nine-inch mill for reducing to the proper size the steel billets to be purchased, or the iron which will be rolled on an 18-inch breakdown mill, located in another building about 50x100 feet. The steel billets purchased will be from 2¼ to 3 inches square. The iron will be rolled of a satisfactory quality in the plant. There will be a machine shop about 40x50 feet, a boiler and pump house, and a cooperage shop for producing the kegs. The capacity at the start will be about 500 kegs of horse shoes a day, employment being given to about 100 men and boys. The plant is expected to be put in operation some time in June. Sufficient ground has been secured to double the capacity of the plant at any time. Besides the domestic trade, the company expects to export a considerable portion of the product.

The company has a capital stock of $100,000, all paid in. The officers are, W. C. Reitz, formerly of the Bindley Hardware Co., Pittsburg, president, and C. E. Beeson, secretary and treasurer. The directors are W. C. Reitz, C. E. Beeson, Wallace H. Rowe, H. C. Huston and W. F. McCook.

THE furnace property of the Rome Iron Co., near Rome, Ga., together with a large tract of mineral lands lying in Cattooga county, Ga., and Cherokee county, Ala., will be sold at the furnace March 27, for the bondholders.

IT is reported that the Roane Iron Co. will build another furnace at Rockwood, Tenn.

STEEL RAIL EXPORTS IN 1898.

The total of 291,038 tons of steel rails exported by the United States in 1898 was distributed as follows: Europe, 31,916; British North America, 107,669; Central American States and British Honduras, 1,070; Mexico, 37,781; West Indies and Bermuda, 7,338; South America, 14,833; Japan, 45,131; Asia and Oceanica, 27,880; Africa, 17,420. These figures show substantial increases over 1897, when the total was 142,808 tons, or less than half that for 1898.

That American rails have displaced English rails is plain from a comparison with the figures for exports from Great Britain in 1898 and 1897. This fact is admitted by London *Engineering*, which has this comment on the British export trade in rails last year:

"The year which has just closed was a discouraging period in the history of our export rail trade. The shipments for December were only 27,457 tons, as compared with 47,516 tons in December, 1897, and 49,772 tons in December, 1896. Rather larger shipments were made to Egypt; but there was a marked decline in the exports to Denmark, Brazil, the Argentine Republic, British Africa, British India, Japan, Mexico and Australasia. The aggregate exports for the whole of 1898 were 476,786 tons, as compared with 579,983 tons in 1897, and 581,249 tons in 1896. Our rail exports increased last year to Russia, Sweden and Norway, Germany (although still unimportant), Spain, Italy, China (slightly), the United States (still unimportant), and Chili. But the business done in several other markets showed a serious contraction. The exports of British rails to Japan, for instance, last year were only 5,142 tons, as compared with 51,917 tons in 1897, and 48,252 tons in 1896. Our rail shipments to British South Africa last year also declined to 43,045 tons, as compared with 59,379 tons in 1897, and 53,870 tons in 1896; to British India to 201,970 tons, as compared with 264,590 tons and 247,739 tons respectively; to Australia, to 31,287 tons, as compared with 81,253 tons and 63,059 tons respectively; to British America, to 6,769 tons, as compared with 10,909 tons and 41,156 tons respectively; to Denmark, to 15,225 tons, as compared with 22,052 tons and 11,144 tons respectively; and to Mexico, to 9,639 tons, as compared with 28,636 tons and 18,769 tons respectively. The falling away in the demand for British rails in Japan is probably attributable to American competition, and the same may be said of the Canadian demand. American rails have also been forwarded during the last few months to British India, but not to any great extent. Our rails held their own pretty well upon South American markets last year, Brazil taking 29,998 tons, as compared with 28,718 tons and 26,759 tons respectively; an the Argentine Republic 50,255 tons, as compared with 51,700 tons and 86,817 tons respectively."

Cheapness of American Locomotives.

The London *Iron and Steel Trades Journal* for Jan. 28 has the following comments on the recent purchase of 20 American locomotives for use on an English railroad: "The locomotives ordered from American firms by the Midland Railway of England are to be of the American Mogul type, with cylinders 18 inches in diameter by 24 inches stroke, and with such modifications in details as are required to conform to British practice. The introduction of these engines in regular service on an English road will be watched with the greatest interest. They are not of abnormal dimensions, being smaller than the average freight engines now being built for use on our own roads, but of the standard size of the freight engines in use on the Midland Railway. This is fortunate, as giving for the first time an opportunity to test the English and American types under identical conditions of service. The cost of the engines, even should the customary English copper fire-box and other specialties be called for, will probably be from 25 to 30 per cent less than if they were of home manufacture; and if they render equally efficient service, as we do not doubt they will, the result cannot fail to have an important bearing on the locomotive trade in that country."

THE rail and Bessemer mills of the Illinois Steel Co. at South Chicago have closed down for repairs. The shut-down will last for two weeks.

IRON FOR CAR WHEELS.

I think it was about two years ago that a little discussion was carried on in these columns as to what kind of iron was best suited for chilled castings. It was claimed by some writers that the practice of making car wheels of coke iron had become common, and the impression was given that coke iron was considered by the manufacturers of car wheels to be equally as good as charcoal iron for the purpose. I could not at that time deny that car wheels were being made extensively of coke iron, though I did deny most strenuously that coke iron was as good for the purpose as charcoal iron.

There was no doubt that coke iron entered largely into the mixture, and, where the right kind was used, perhaps without detriment; but, my contention was that the charcoal iron ingredient was depended on for chilling tendency. I believed that there was no coke iron made anywhere that could be properly called a chilling iron. Since that time I have read practically all that has been written on foundry topics, and it all points to the rectitude of my position. Messrs. Henderson and Walley, of the Norfolk & Western Railway, give the results of recent investigations in this line in the *American Engineer and Railway Journal*. Having decided as to the chemical requirements, they analyzed and tested 27 samples of iron, the coke brand being conspicuous by its total absence, the samples being entirely of charcoal iron.

The truth probably is that some foundrymen, a few years ago, really imagined that they had made a very valuable metallurgical discovery, viz.: that charcoal iron was not necessary in the chilling mixture. But they soon discovered their error; probably early enough to prevent any serious disaster. It was about that time, or perhaps a little later, that the severe thermal test was introduced, if my memory serves me right; and, under this, and the drop test employed, it would not take long to demonstrate the worthlessness of an all coke iron car wheel.

It has been pointed out that the comparative production of charcoal iron has greatly fallen off of late, and this has been given as indicating that it is being rapidly abandoned by makers of car wheels. It should be remembered that until a few years ago, nearly all malleable iron furnaces used charcoal iron exclusively; but that, since the discovery that coke iron is fully as good for this purpose, it is being generally used instead. This alone would account for a tremendous falling off in the demand for charcoal pig. But, though coke iron is not a chilling iron, and is therefore unfit to be used alone in the manufacture of chilled castings, yet it can be, and is, largely used in the chilling mixture; more largely for the last two years than ever before; and this accounts, no doubt, for a great part of the falling off in demand for charcoal iron.

Whether the prediction of the final discontinuance of the production of charcoal iron will be verified or not, depends on future developments in metallurgy. It is but a short time ago that all our steel was cast from the crucible, and there was, consequently, but little steel used; but so rapid has been the evolution of processes in steel manufacture that to-day it is cheaper than wrought iron, and, for many uses it is economically displacing cast iron. It would be foolish to deny the possibility of making iron by some other process than by charcoal smelting that may be the equal of charcoal iron in every respect, chilling tendency included. But, unless some advance be made in this direction very soon the demand for charcoal iron will increase; because, the foundrymen, for some years past, have used very high percentages of old car wheel scrap in lieu of charcoal pig in their chilling mixtures, and the per cent of charcoal in the product is less, therefore, than formerly, and they will be forced to increase the per cent of charcoal pig in the mixture in order to sustain the quality of the goods. It is a well known fact that new iron must be added to a mixture in order to success in founding, and the makers of car wheels cannot go on indefinitely using old car wheel scraps as the sole chilling element. I do not mean to say that this has been done very generally, but there is no doubt that some people have carried the practice farther than they will be able to continue.—[E. H. Putnam in the Tradesman.

IT is stated that the Buhl Steel Co., Sharon, Pa., will erect additional open hearth capacity and several new soaking pits.

THE STORY OF AN OLD BOILER.

As illustrative of one cause of boiler explosions into which the public rarely inquires, namely, the inability of the material to hold the pressure, the *Locomotive* tells a story of a boiler that ought to have exploded long ago, "according to all reasonable lines of argument and methods of prognosis." Yet it is still running after nearly half a century of service, the total outlay for repairs during all that time being one old-fashioned copper cent:

"About 1853, Mr. Chauncey Pease, of Cooperstown, N. Y., had a steam boiler built in New York City, by a builder whose name is long forgotten. It is a horizontal tubular, with a dome, and is rated at 15-horse power. It is 9 feet long and 36 inches in diameter, with 37 two inch tubes. It is made of iron, in three courses, and single-riveted, with the rivets pitched two inches from center to center. There is no glass water-gauge on it, but there are three try-cocks. When it was to be installed, it was sent by rail to Fort Plain, N. Y., and transported thence by teams over the country to Cooperstown (a distance of perhaps 30 miles), where it was in use two years by Mr. Pease. It was then sold to Messrs. Barnes & Fox, who moved it by team to the town of Maryland, on the Delaware & Hudson Raliroad, some 15 or 20 miles from Cooperstown, and used it for 10 years in a sash and blind factory. At the end of this time Mr. F. M. Fox, the present owner, bought the factory, and moved the boiler a few miles to Colliersville, where for 33 years more it has done service in his sash and blind factory, and is still in daily use. Thirty years ago it leaked slightly, where the dome was riveted to the boiler. The hole was hardly large enough to insert a fine knitting-needle, and Mr. Fox enlarged it to a diameter of one-eighth of an inch, and plugged it with a copper rivet made from an old-fashioned copper cent. With this exception, no repairs have ever been made on the shell or tubes of the boiler. The fuel with which the boiler has been fired has been the waste of the mill, with a little coal when there was not waste enough for that purpose. The safety-valve has been kept set at 80 pounds, but the actual pressure used in all these years has been (and is still) 60 pounds. No one has been inside the boiler, except on one occasion, some 18 years ago. It is cleaned out as well as it can be without getting into the boiler every three weeks, the tubes being cleaned oftener. There has never been a regular engineer caring for the boiler; it has had all its attention from the proprietors and the men about the mill. The first engine used with it was of 10 h. p., but a change was made 30 years ago and a 35 h. p. engine substituted, running at 60 strokes to the minute, under 60 pounds of steam. After a time Mr. Fox modified the engine so as to make it run at 90 strokes to the minute under 60 pounds of steam, and it is now working at this speed under the personal supervision of Mr. F. M. Fox, who is hale and hearty at nearly 70 years of age.

"We have given this history at some length, in order to show what boilers will do,—sometimes. We might, on the other hand, relate instances in which men were killed and maimed, and thousands upon thousands of dollars' worth of property was destroyed, by boilers only two or three months old, and which were supposed to be in perfect condition. It is the old story, so aptly expressed in Prof. Sweet's article on "The Unexpected which Often Happens," quoted in the *Locomotive* for April, 1898. "The unexpected comes upon us," he says, "both by things not working when we think they ought, and by their working when common reasoning would indicate that they ought not." So it is with boiler explosions; for they do not always occur when we think they ought to, and they often do occur when common reasoning would indicate that they ought not. A man may smoke a T. D. pipe in a powder mill for a long term of years without his subsequent experiences being worthy of special mention; but it isn't a good plan to do that way. Neither is it a good plan to neglect your boiler because some other man has succeeded in running one on that basis for half a century or so. Reason is against it; and reason was given to man to guide him, and not to be shoved aside on a shelf."

THE Bucyrus Co., South Milwaukee, Wis., is very busy on recent steam shovel contracts. An additional force of machinists is being put on.

CHARCOAL IRON FOR TIN PLATE.

An exchange brings up that frequently discussed topic, the manufacture of charcoal plate for tinning. It admits the much greater cost of charcoal plate compared with that made from Bessemer, but states that its high price would not deter it from being used for special purposes where ductility is demanded. The fact is a certain amount of so-called charcoal iron tin plate has always been upon the market, and the present status of this material is rather interesting. The old distinction between charcoal and coke plate meant something when the former was made from refined charcoal pig iron worked in a knobbling fire, and the latter was made from the ordinary coke pig iron. But with the development of Bessemer steel, charcoal iron was pushed aside on account of its greater cost. Tin plate manufacturers, however, kept up the old distinction, although in most cases "charcoal" merely means a plate with a heavier coating than that given the "coke" plate. Several firms, however, still claim to make plates from genuine charcoal iron, although their claims have been questioned.

Of course the one great reason why charcoal plate is not used more extensively for tinning is its high cost. The knobbling process is used in but one mill in the Pittsburg district and that is employed in manufacturing tube material which brings a very high price. To make the old charcoal plate the knobbling fire is a necessity, and would be an additional expense even were the cost of charcoal pig no greater than that of Bessemer. According to a recent announcement an effort is being made by the Ashland Iron & Steel Co., of Ashland, Wis., to produce charcoal pig at a cost about equal to that of coke iron, by reducing the cost of charcoal. The Zwillinger method of carbonization invented by Dr. Leopold Zwillinger of Vienna, Austria, is to be used. This is said to yield a hard charcoal containing 88 per cent carbon, beside saving the by-products. But the feasibility of this plan remains to be demonstrated. It is more likely that the demand for a better quality of tin plate will lead to an increasing use of open-hearth steel, and charcoal plate may come in later, when its cost is greatly reduced, or tin plate users want something still better than open-hearth steel.—[Tin and Terne.

The "Samson" Paper Punch.

The Samuel C. Tatum Co., of Cincinnati, O., in addition to the adjustable punch or file perforator shown in a recent issue, have brought out a smaller punch to punch two holes 2¾ inches apart, center to center, this being the standard distance

for arch and cabinet files. This punch can be used for perforating loose sheets of every description. It is claimed it will easily punch through 25 sheets of ordinary 16 pound folio paper. In the illustration the gauge at A is adjustable to any desired margin, and may be used on either side. The two cups set over the center receive all the perforations and avoid the otherwise very annoying litter.

STOCKHOLDERS of the Cramp Ship & Engine Building Co., at the special meeting last week authorized the proposed new issue of $1,500,000 30-year first mortgage 5 per cent gold bonds, which are for the retirement of all outstanding obligations, including $537,000 maturing mortgage bonds and $500,000 secured floating indebtedness and for providing working capital.

PORTABLE RETURN TUBULAR BOILER.

The Bay State Iron Works, of Erie, Pa., have designed a boiler embodying important features that contribute to economy of construction and operation. As will be seen, brick setting is dispensed with, and portability is a feature that has been studied. The fire box, with water front, back and sides, is noteworthy, in that it makes of the boiler a very rapid and easy steamer, the water being exposed to the intense

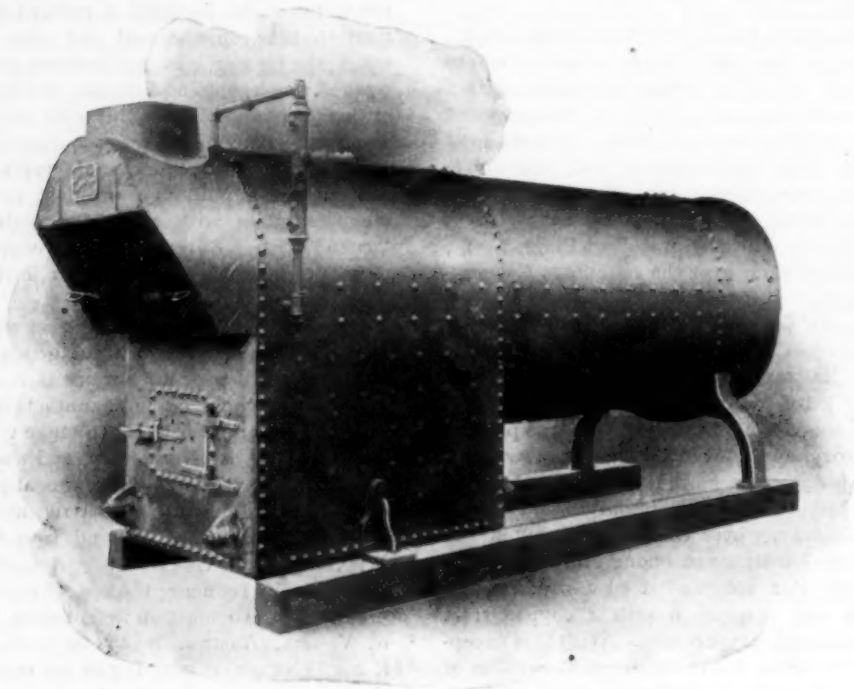


FIG. 1.—PORTABLE RETURN TUBULAR BOILER.

heat of the fire box instead of having the heat radiated by brick linings. There is a large body of water above the crown sheet and thus burning the latter is made very difficult.

The sectional cuts show the construction—the fire box surrounded by water; the large tubes leading from the fire box to the combustion chamber and the smaller tubes making the return.

These boilers are adapted to power plants of all kinds and give economical results when used for heating purposes.

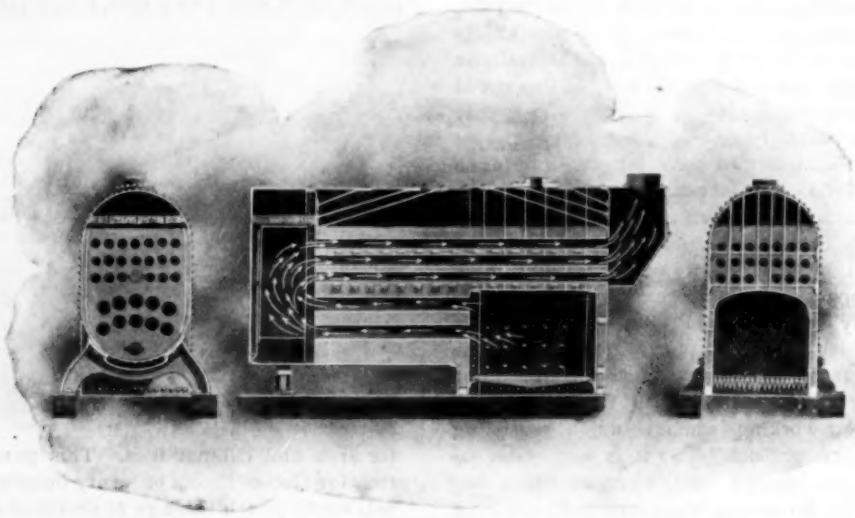


FIG. 2.—PORTABLE RETURN TUBULAR BOILER.—SECTIONAL VIEW.

They are braced and stayed throughout and are tested to 150 pounds water and 100 pounds steam pressure. In the 50 h. p. boilers and larger there is a manhole in the top of the shell, and smaller sizes have six hand holes, four in the water leg, one in the back head under the tubes and one in the front head over the crown sheet.

The range of sizes is from 10 h. p. to 80 h. p. In the former the diameter is 28 inches; length of furnace 36 inches; width and height, 24 inches; the length of boiler, 108 inches, and the weight 4,000 lbs.

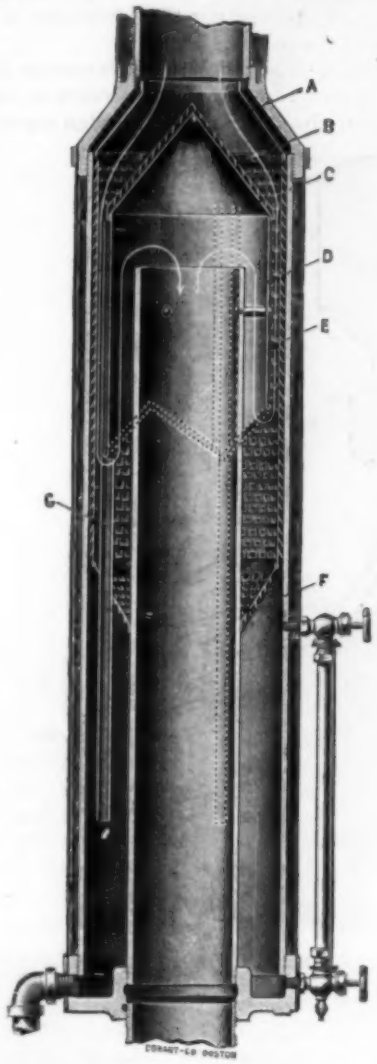
ILLINOIS STEEL CO.

The adjourned annual meeting of the stockholders of the Illinois Steel Co. was held at the offices of the company, the Rookery, Chicago, Thursday, Feb. 23. Directors were elected as follows: Robert Bacon, W. L. Brown, E. J. Buffington, C. C. Cuyler, Marshall Field, Nathaniel Thayer, C. H. Foote, E. H. Gary, T. J. Hyman, Morgan Rotch and E. H. Shearson. The new directors are Messrs. Bacon, Buffington, Foote, Hyman and Shearson. Of these Mr. Buffington is president of the company; Mr. Bacon is president of the Minnesota Iron Co.; Mr. Shearson is auditor of the Federal Steel Co.; Mr. Foote is one of the vice-presidents of the Illinois Steel Co., and Mr. Hyman is secretary of the company. No financial statement of the company was given out, and none will be given out in the future, except as it may come from the Federal Steel Co., which controls the Illinois Steel Co. A meeting of the board of directors for the purpose of electing officers of the Illinois Steel Co. for the ensuing year will be held at Chicago some time in the present week.

At a meeting of the directors of the Illinois Steel Co., to be held at the company's offices in Chicago, on Thursday of this week, the following officers will be elected: President, E. J. Buffington; first vice-president, C. H. Foote; treasurer, W. H. Thompson; secretary, T. J. Hyman; executive committee, W. L. Brown, chairman, Marshall Field, E. J. Buffington, Robert Bacon, of Chicago, and C. C. Cuyler, of New York.

THE SWEET SEPARATOR.

After a long series of experiments at Cornell University, it was found that the best means of removing water from steam was by passing the steam over a corrugated or rough surface, to which the little particles of water would adhere, and, unless again picked off by the steam current, trickle along the sides of the separator to the water chamber. It occurred to the inventor, Prof. John E. Sweet, that a broken surface so constructed that it would immediately conduct the little particles of water from the steam current, and keep them from further contact with it, would make a perfect separator, provided the surface were of sufficient area. This is the construction followed in the separator of which a sectional view of the vertical style is shown in the accompanying illustration. This device is manufactured by the Direct Separator Co., of Syracuse, N. Y. In addition to the feature noted above the apparatus also makes use of inertia.



In the vertical style the accumulated moisture around the walls of the steam pipe is caught by the upper edge of the cone A and carried down back of a lining to the water chamber. The current of the steam entering the separator impinges upon the conical surface composed of the solid plate C covered with a sieve B, through which water may freely pass, but from which it cannot readily escape. Passing through the sieve and depositing on the solid surface of the cone C this water is carried by conductors to the water chamber. By means of the cone the column of steam is changed to an annular ring, which is comparatively thin, even while the full area of the pipe is maintained. The steam upon the outside of this ring comes in contact with the lining of the shell, which has a sieve of the same character, as at B, and which catches and entrains any water which may be contained in that portion of the current. There is also provided a lip at the lower edge of the inverted cup, which leads all the water that may adhere to its surface down to the conductors to the water chamber. The current of steam passes through the passages indicated by white lines, and is subjected to a whipsnapping action which will throw off moisture which has not been caught by the surface over which it has passed. The diaphragm F prevents the steam from picking any water out of the water chamber. The separator is designed to be placed next to the engine, when possible, giving no chance for condensation before the steam is used. As soon as a drop of water is separated it does not again come in contact with steam, and cannot be picked up and carried to the engine. The steam passing down at a high velocity, and then quickly reverses its direction, precipitating the moisture, which is heavier than the steam, to the water chamber; and the areas are so arranged as not to cause any loss in steam pressure.

The vertical separators in all sizes up to six inches inclusive are made with steel bodies and cast iron heads and bases; above this to 16 inches inclusive entirely of cast iron; and larger, of boiler plate. The cone A, lining E and diaphragm F are made of cold rolled copper. The cone C is a gray iron casting, resting on three cast iron supports hooked over the top of the inner pipe. These supports extend down the side of the pipe the full length of the cylinder D, and this cylinder is securely riveted through these supports to the inner pipe.

The horizontal machines are made of the same material as above. The ends of the steel body pipes are first rounded by a blacksmith, the threads cut in a lathe, then tinned, and after putting the pipe in place, the whole machine tested at 250 pounds hydrostatic pressure.

Virginia Iron Consolidation.

The negotiations under way for some weeks for the amalgamation of blast furnace, iron ore and coal properties in Virginia, reached by the Norfolk & Western Railroad, were completed last week. The Virginia Iron, Coal & Coke Co., the new corporation, has a capital of $7,500,000 and in addition is authorized to issue $10,000,000 first mortgage five per cent gold coupon bonds. Five coal mines already in operation, are included, and nine blast furnaces, besides nearly all the available ore properties in Norfolk & Western territory. The companies and properties included in the scheme are: Dora Furnace Co., Pulaski, Va., one furnace; Max Meadows Iron Co., of Max Meadows, Va., one furnace; Radford Crane Iron Co., Radford, Va., one furnace; Graham Furnace Co., Graham, Va., one furnace; Salem Furnace Co., Salem, Va., one furnace; Buena Vista Furnace Co., of Buena Vista, one furnace; Crozer Iron Co., Roanoke, Va., two furnaces; Bristol Iron & Steel Co., Bristol, Va., one furnace; Crescent Horseshoe & Iron Mills; Reed Island Co., iron ore and limestone; Locust Hill Iron Co., iron ores; Foster Falls Mining & Mfg. Co., iron ores and limestone; Stone, White & Speedwell Iron & Mfg. Co.; Cripple Creek Ore Co., iron ores and limestone; Edith Mining Co., iron ores; Blue Ridge Mining Co., iron ores; Consolidated Coal, Land & Iron Co., iron ores; Wheeler Co., iron ores and limestone. Geo. L. Carter, who is president of the new company, is also made president of the Virginia & Southwestern Railway Co., which has secured the South Atlantic & Ohio Railroad and the Bristol, Elizabethtown & North Carolina Railroad.

It is reported that some tentative efforts have been made, looking toward a similar consolidation of furnace and ore properties along the Chesapeake & Ohio Railroad, but the project has not assumed tangible shape as yet.

Mitchell, Tranter & Co. Extensions.

George M. Clark, for himself and associates, has purchased all of the Mitchell and the Tranter interests, in Mitchell Tranter & Co., of Cincinnati, excepting about one-sixth of the stock which is owned by an estate and is in court temporarily, but on which Mr. Clark has an option. The company has been reorganized and George M. Clark, formerly treasurer, is now president. W. E. Reis, of New Castle, Pa., who is the president of the new National Steel Co., was made vice-president, and Jas. A. Sebastiani has had added to his duties as secretary, those of treasurer. The company having ample capital now at its disposal, proposes at once to remodel the plant completely, adding largely to its capacity, and to install all the latest mechanical and electrical appliances. A new and larger plate mill and a continuous bar mill are already under contract. The mill, which is located at Covington, Ky., was built in 1873. Its product is plates, sheets, channel, angle and merchant iron, plow steel and horseshoe bar and refined iron. It is well located for the Southern trade, as well as for that in tributary districts north of the Ohio River; and with the energetic management of Mr. Clark supplemented by capital sufficient to modernize the plant thoroughly, a successful campaign is assuredly ahead.

ACETYLENE GAS FOR SHOP LIGHTING.

Advantages, both in cheapness and in the quality of the light furnished, are being claimed for acetylene gas, and demonstrated by plants in operation, that have attracted attention of late, from manufacturers and all light users. For shop, house and general interior illumination acetylene gas and the Patterson equipment for its manufacture are being vigorously pushed by the Norwalk Foundry & Machine Co., of Norwalk, O. Since acetylene gas was first exploited it has been rapidly making its way into use and favor. As is well known, acetylene is obtained from calcium carbide, which is produced from a mixture of 65 per cent lime and 35 per cent coke fused together by an electric process. The discovery 10 years ago of this method of producing acetylene in large quantities, by the use of electricity, has made it a commercial possibility for lighting, and a vast amount of capital is now being invested in calcium carbide production, the world over. The gas made from it is estimated to have from 20 to 40 times the illuminating power of ordinary gas, while the heat evolved is two-fifths less from the same size of flame. The gas is manufactured by the addition of water to the calcium carbide and it may either be stored in large gasometers or produced for immediate use as required. It is stated that the cost of employing this gas is now less than that of ordinary gas and the price is being considerably reduced by the reduction in the price of calcium carbide. This will be further lessened when other large plants for the production of the latter are completed.

The Patterson automatic acetylene gas generator, which is being manufactured in Ohio territory by the Norwalk Foundry & Machine Co., is offered as embodying a very simple and practical method of manufacture, and one that removes all danger. A view of the apparatus is given in Fig. 1, and Fig. 2 shows in section the construction. A and B are the top and bottom, respectively, of the gas holder; C, a pipe covering the escape pipe D; E, cooler and supply pipe; F, condenser; H, supply pipe to shop or house; I, outlet showing how high to fill with water; J, condenser to escape pipe; K, lower water supply tank; L, main water supply tank; M, air vent pipe to lower water tank; N, water trap and supply pipe to spreader, O; P, carbide pail; Q, water seal to generator; R and S, lower and upper water supply cocks, respectively.

The features of the Patterson generator may be summarized thus: It makes gas only as used, the amount of gas consumed regulating the water supply. Control of the latter is secured, and the flooding of the carbide chamber when the gas is exhausted, is prevented by shutting off the supply at the top of the lower chamber, at the same time as it feeds below. Turning on or off burners does not change the pressure and nothing beyond ordinary gas pressure can be gained in any part of the machine or pipes. The escape pipe is twice the size necessary to carry any volume of gas that the source of supply can furnish from the water cock. Safety locks compel the operator to shut off the gas between the gas holder and generator, before the latter can be re-charged, preventing the gas backing from the gas holder. Water seal generators do away with rubber washers or clamp seals. Shaking of the carbide is done away with, as this fills the pipes with rising dust. The provision of two generators, with an automatic device for the transfer of water from one into the other upon exhaustion of gas in the generator used, permits the recharging of the other generator at leisure in the day time. There is no odor, a simple device entering the escape pipe ridding the generator of the gas it contains at the time of recharging, preventing the liberation of gas which would otherwise rise to floors above.

The apparatus is provided with condensation chambers on all levels, to prevent trapping and screens on all water supplies to prevent the admission of foreign matter. It is impossible to tighten the water cocks so that they will not turn with thumb and finger. As indicating its safety it is stated that this machine is allowed by insurance companies without extra rates.

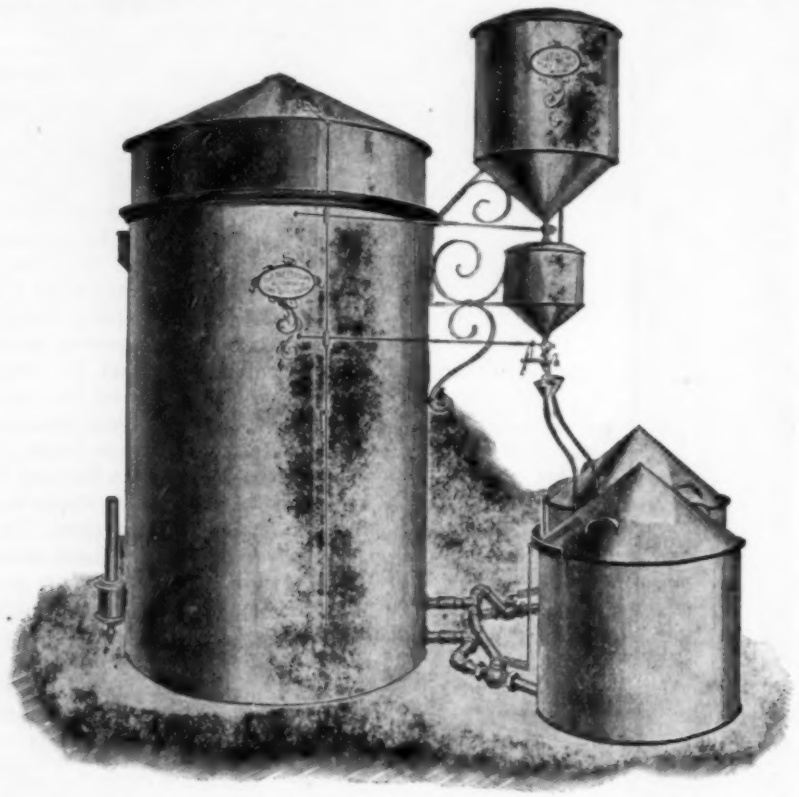


FIG. 1.—PATTERSON AUTOMATIC ACETYLENE GAS GENERATOR.

The only change necessary, where gas pipes are already in, is the substitution of acetylene burner for the ones used with other gas. The ½-ft. acetylene flame, shown in Fig. 3, gives as much light it is claimed as a 10-ft. ordinary gas flame. As to its hygienic status, it is stated that an ordinary 5-ft. burner giving 18 candle power, using city gas, vitiates the air to the same extent as the exhalations of 18 persons. The ½-ft. acetylene burner only vitiates 1½ times the volume of air vitiated by one person, and besides gives 25 candle power.

The Norwalk Foundry & Machine Co. will send illustrated descriptive matter and detailed estimates of cost of installation and operation.

Finished Material Exports from Birmingham.

James Bowron, treasurer of the Tennessee Coal, Iron & Railroad Co., in a recent interview with the *Manufacturers' Record*, Baltimore, said:

"Alabama iron has taken good hold in foreign markets, and I believe the export movement will continue on some scale for all time in future. The iron competes chiefly with

Scotch and Middlesboro iron. It is in every respect equal to Scotch iron and better than Middlesboro. It is cheaper, even including cost of delivery to distant ports, than Scotch iron and as cheap as Middlesboro, and ought to command a preference over the latter when consumers are sufficiently educated to its use. It is not desirable to my mind that the movement should continue on the scale that we have seen it in the past. It does not speak well for the enterprise and good judgment of American capitailsts that the large product of cheap Birmingham material should be sent to every part both of the United States and also Europe, Africa and Asia, to be there worked up into finished material. Instead of so large an export of pig iron I look for a diminished shipment of this material and the establishment of exports from Birmingham of rails, tank and boiler plates, wire, bars, nails, billets and castings. Birmingham ought to play a conspicuous part in providing material for the railroads, rolling stock, and bridges, and for the sugar houses of Cuba, Porto Rico and Hawaii. It cannot compete on equal terms at present for the trade of India, China and Japan, but with the completion of the Nicaraguan Canal it will enjoy a preferential situation over any other steel and iron producing district in this country, owing to its greater proximity to tidewater, its greater proximity to the canal, and its ability to combine light and bulky cotton freights with the export tonnage of iron and steel."

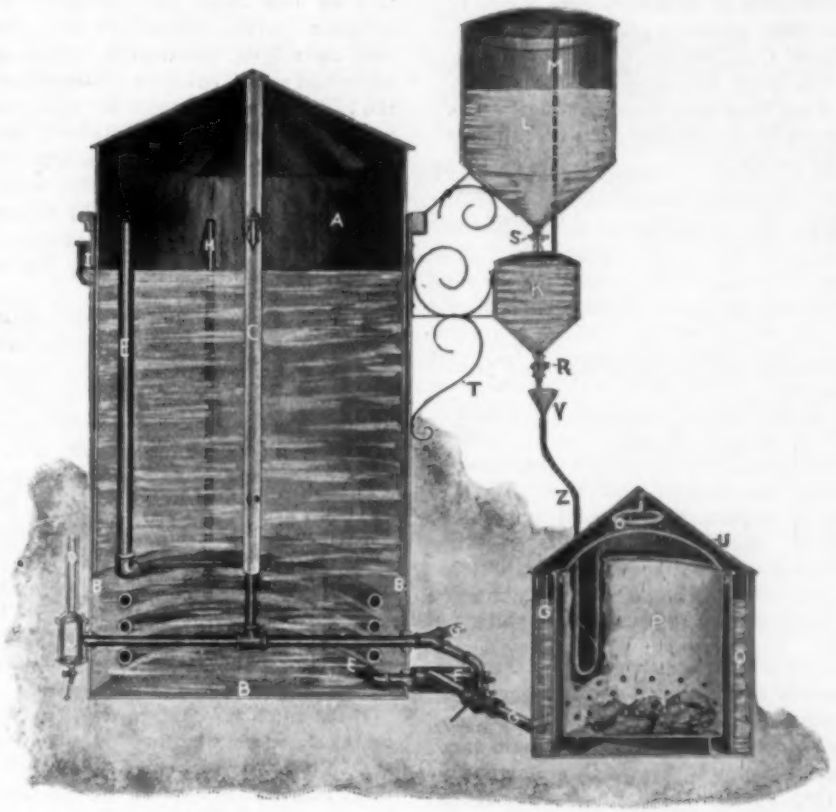


FIG. 2.—PATTERSON AUTOMATIC ACETYLENE GAS GENERATOR.—SECTIONAL VIEW.

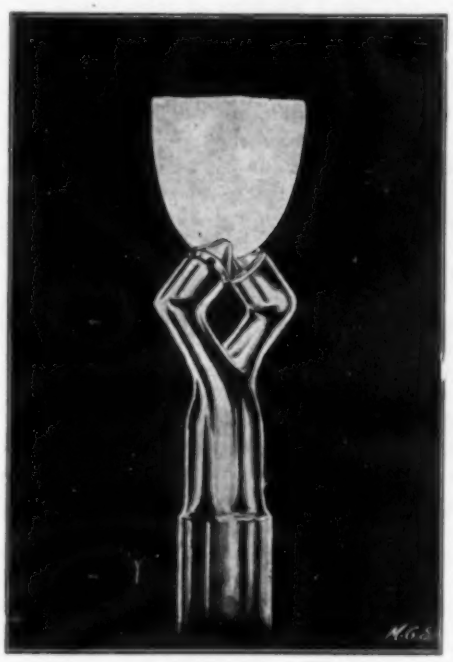


FIG. 3.—½-FT. ACETYLENE FLAME.

Heavy Cost of Ship Yard Organization.

Collis P. Huntington, who has become an important figure in American shipbuilding through the development of the great Newport News enterprise, makes this interesting statement to the *Marine Review* concerning the work under way there, and what may be expected for American shipbuilding in the near future: "My experience this year has entirely justified my judgment in establishing the Newport News yard and in maintaining the best possible organization under adverse circumstances. I would rather lose $100,000 a year than shut down and turn 5,000 men adrift and then try to get them together again. On each of four ships now building, each costing $600,000, all but $60,000 will go for labor and material. On four ships for which I got $2,000,000 I made only three per cent. On three other ships, on which I expected to lose $50,000, the loss was $60,000. The Hanna-Payne shipping bill ought to pass, but it will not pass at this session. As for the naval bill, I am in favor of a large navy, not because I am a ship builder, but on general principles. I believe that inside of 20 years America will be the greatest ship building country in the world. Material is constantly getting cheaper here, while in England the problem of raw material is constantly becoming more serious. We contemplate no improvements here at present, except the new dry dock, piers and crane, now under way."

It is announced unofficially that the two Pacific Mail Line steamships, for which contracts were placed recently at Newport News, will each be of 18,500 tons displacement, and will therefore be the largest ships ever built in this country. This displacement is quite close to that of the Kaiser Wilhelm der Grosse. Dimensions of the Pacific Mail ships as announced are: Length, 550 feet; beam, 63 feet; draft, 31.5 feet; speed, 18 knots.

The Braeburn Steel Co., Braeburn, Pa., manufacturer of the BS brand of tool steel, is making some additions to its plant and adding some new equipment. Included in this are three new hammers, two new heating furnaces and a 250-ton steam and hydraulic press. The demand for the fine grades of tool steel made by this concern is constantly increasing and the works are running to full capacity.

BESSEMER STEEL PRODUCTION IN 1898.

The American Iron and Steel Association has just collected the statistics of the production of Bessemer steel ingots and rails in the United States in 1898. No account is taken of the comparatively small quantity of standard rails and street rails made by manufacturers from purchased blooms, or re-rolled from old rails. No Clapp-Griffiths works were in operation in 1898 and only one Robert-Bessemer plant was active. The current issue of the *Bulletin* gives the statistics as follows, the ingot statistics including the production of steel castings by all Bessemer works.

Ingots.—The total production of Bessemer steel ingots in 1898 was 6,609,017 gross tons, against 5,475,315 tons in 1897, showing an increase in 1898 of 1,133,702 tons, or over 20 per cent. The production of 1898 was much the largest in our history. Of the total production 3,539 tons were steel castings. The following table gives our production of Bessemer steel ingots and castings in the last six years:

Years. Gross Tons.	Bessemer Ingots.	Years Gross Tons.	Bessemer Ingots.
1893.....	3,215,686	1896.....	3,919,906
1894.....	3,571,313	1897.....	5,475,315
1895.....	4,909,128	1898.....	6,609 017

The following table gives the production of Bessemer steel ingots by States since 1895:

States—Ingots.	1895. Gross Tons.	1896. Gross Tons.	1897. Gross Tons.	1898. Gross Tons.
Pennsylvania.....	2,978,924	2,292,814	3,060,~49	3,402,254
Ohio.....	719,954	568,535	1,041,543	1,489.115
Illinois.....	866,531	780,105	943.774	1.105 040
Other States.....	343,719	278,452	429,951	612,608
Total.....	4,909,128	3,919,906	5,475,315	6,609,017

Rails.—The production of all kinds of Boessemer steel rails by the producers of Bessemer steel ingots in 1898 was 1,955,427 gross tons, against a similar production in 1897 of 1,614 399 tons and 1,102,892 tons in 1896. The maximum production of Bessemer steel rails by the producers of Bessemer steel ingots was reached in 1887, when 2,044,819 tons were made. The following table shows the production by States of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years:

States—Rails.	1895. Gross Tons.	1896. Gross Tons.	1897. Gross Tons.	1898. Gross Tons.
Pennsylvania.....	837,043	663,096	1,024,386	1,052,771
Other States.....	429 038	439,796	590,013	902,656
Total.....	1,366,081	1,102,892	1,614,399	1,955,427

At the request of the steel rail manufacturers we separated for 1897, for the first time, the production of Bessemer steel rails weighing 45 pounds and less than 85 pounds to the yard from those weighing less than 45 and over 85 pounds. This separation we continue for 1898, as follows:

States—Rails.	Under 45 pounds. Gross Tons.	45 pounds and less than 85. Gross Tons.	85 pounds and over. Gross Tons.	Tota'. Gross Tons.
Pennsylvania.....	67,558	670,290	314,923	1,052.771
Other States.....	52,368	712,343	137.945	902,656
Total.....	119,926	1 382,643	452,868	1,955,427

Sheet Mill Consolidation.

At the meeting of the sheet manufacturers in Pittsburg last Wednesday, the consolidation project was discussed, and a committee was appointed composed of J. G. Battelle, president of the Iron & Steel Sheet Manufacturers' Association, and president and general manager of the Piqua Rolling Mill Co., Piqua, O.; A. W. Brown, vice-president and general manager of the Cambridge Iron & Steel Co., Cambridge, O., and Hon. N. E. Whitaker, president of the Whitaker Iron Co., Wheeling, W. Va. This committee will report at a meeting to be held early in March.

THE GENERATION OF ACETYLENE.

Of the many methods and schemes proposed by different inventors for the automatic generation of acetylene, possibly the simplest is that adopted by some of the manufacturers of bicycle lamps and portable house lamps, in the operation of which the demand for gas, once existing, does not vary. The gas is generated by feeding the water into the carbide chamber drop by drop, continuously, while the light is wanted, safety appliances in the form of a valve or water seal being provided to allow the gas to escape if generated too rapidly. The form in which the carbide is introduced into the generators of this type has demanded much attention. Some designers use the carbide in a semi-powdered condition, made into cartridges, presumably under pressure, incased in an absorbent paper covering. Other designers in this class use the carbide in a granulated state, incased in a tin cylinder provided with a central perforated tube into which the water is allowed to drop. Others use absorbent paper partitions to subdivide the mass of carbide, while some use glass disks. The carbide is used by others in its normal state, contained in a number of shallow iron pans having solid bottoms and perforated sides, the water being fed into the calcic carbide chamber from below.

Another successfully practiced scheme of automatic generation is an adaptation of the well-known principle of the hydrogen gas generator. In this the supply of carbide is brought in contact automatically with a comparatively large body of water. The carbide receptacle is attached to the top of a gasometer. As the gasometer falls, the carbide comes in contact with the water, and the gas which is generated forces the gasometer up, thereby removing the carbide from intimate contact with the water. The gas generated from the moisture absorbed by the refuse, and also that generated by the vapors arising from the surface of the water, is taken care of by gasometers of ample capacity. As the gasometers fill, they automatically shut off any further supply, and if the generator should be filled, a safety appliance is provided which allows the gas to escape out of doors.

If the demand be intermittent, as is the case when the gas is used for general illuminating purposes, this type of generator should never be employed unless provided with a sufficiently large reservoir to hold all the gas that the amount of carbide used is capable of generating, or by making the containing vessel sufficiently strong to withstand the consequent increase in pressure. When an increase in pressure is employed, automatic reducing valves or governors should be used to reduce the pressure from whatever it may be in the generator to one equivalent to a column of water between two and three inches in height, at which pressure the acetylene burners give the best results.

A recent machine, quite novel and simple, consists of a series of isolated receptacles, arranged in steps, each holding a comparatively small quantity of carbide and all connected by means of pipes to a common gasometer and automatic water feed. There are a number of types, styles and designs of automatic water feed, all accomplishing the same result, namely, introducing water into the carbide receptacle automatically as the gas is consumed. The gasometer is of such a size that it will hold all the gas generated after the demand ceases at any time. As the gasometer falls, it automatically turns a water cock, allowing the water to rise from below and enter the lowest receptacle. After slacking all the carbide in the first chamber, the water rises to the next, and so on through each compartment. This arrangement has given very good results.—[C. A. S. Howlett in Cassier's Magazine for March.

Advancing Prices in Metals.

The following, from the daily market report of the New York Metal Exchange, indicates the relative positions of metals in New York on the last day of February, 1899, and in the preceding three years:

	1899.	1898.	1897.	1896.
Pig Iron Warrants	9.25	6.55	6.75	.....
Copper	17.87½	11.67½	12.00	11.07½
Tin.....	24 50	14 15	13.55	13-37½
Lead.....	4.35	3 80	3 35	3.12½
Spelter	6.50	4.20	4.05	4.05

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

At Haydenville Conn., a new brass company is being promoted by Messrs. Hill and Sanborn and plans are taking shape in subscriptions of stock by citizens.

The Eureka Steel Mfg. Co., of Kankakee, Ill., has purchased a building at Kokomo, Ind., and will use it for the development of a new process.

The Larkin Mfg. Co., St. Paul, Minn., has been organized, E. J. Larkin as president, to do a general manufacturing and engineering business. It will make a specialty of reducing cost of operation in steam plants, and intends to manufacture a line of Corliss engines and steam specialties.

The organization of the Muskegon (Mich.) Iron & Steel Co. has been completed by the election of D. M. Hillis as president; J. C. McLaughlin, vice-president, and John E. Jones, secretary and treasurer.

New Construction:—

The Tyler Tube & Pipe Co., Washington, Pa., manufacturer of charcoal iron boiler tubes, has decided to enlarge its works, and will erect an iron building 40 x 100 feet, which will be built by the Fort Pitt Bridge Co., of Canonsburg, Pa. The A. Garrison Foundry Co., of Pittsburg will furnish an 18-inch train of rolls, and the Bass Foundry & Machine Company, of Fort Wayne, Ind., a 500 h. p. Corliss engine.

The plant of the Oswego (N. Y.) Boiler Co., burned some time ago, is to be rebuilt at a cost of $10,000. The main building will be 300x65 feet with an annex 50x75 feet for engine room and machine shop.

The Chattanooga (Tenn.) Steel Roofing Co. is building an addition to its plant.

The Magnetite Foundry Co., St. Louis, Mo., is building a foundry 80x185 feet.

Sandusky Iron Works, at Sanilac Center, Mich., sustained a $1,500 fire loss.

C. F. Ringer is architect for a machine shop to be built at Milwaukee, Wis., the name of the owner being withheld. The building is to be three stories, 114x126 feet in size.

The Moline Plow Co., Moline, Ill., will build a 10-story warehouse, 150x170 feet in size, and a two-story foundry, 150x150 feet in size. The equipment includes two boilers, 66 inches by 16 feet; one engine 200 h. p.; one dynamo, 800 lights; one blower, one exhaust fan, 24 rattle boxes, scrap and casting conveyors, machine tools, a 72-inch cupola, etc. The machinery will cost about $30,000.

The Falk Mfg. Co. and the Western Gear Co., Milwaukee, have consolidated under the name of the Falk Co. The company has purchased a tract of land on the Menomonee and will erect a foundry and machine shop. The officers of the consolidated company are: President, Herman W. Falk; vice-president, Clement C Smith; second vice-president, Adolph Quentin; secretary and treasurer, E. A. Wurster; assistant secretary, Charles L. Jones.

Curtis & Curtis, manufacturers of pipe cutting machinery, Bridgeport, Conn., are erecting an addition to their plant.

The W. M. Thompson Co. will remove its engine works from Leeds to Sioux City, Ia., enlarge the capacity of the plant, and give employment to a larger force of men. It has acquired the machinery of the old Sioux City Engine & Iron Works, and will erect a new building, 50 x 140 feet. It will manufacture engines and drilling machinery.

The Youngstown Foundry & Machine Co., Youngstown, O., has in contemplation the building of a machine shop to its plant. A building now used as a warehouse will be used, and an addition built to it. The machine shop will be erected late in the spring.

The Magnetite Foundry Co., of St. Louis, has begun the erection of a one-story foundry building, covering an area of 80 x 185 feet. The Pittsburg Bridge Co. is the contractor, and the estimated cost is $10,000.

The Fowler Radiator Works, Johnstown, Pa., will be enlarged in the near future. The capital stock of the firm is to be increased from $25,000 to $50,000. The improvements will be made to the steel foundry, switch and motor works.

An extension of the main building of the Lorain Foundry Co., Lorain, O., is contemplated. The company is constantly booking orders, in addition to large contracts on hand.

Power Equipment and Machine Tools.

A Springfield, Mass., dispatch says that the Chapman Valve Mfg. Co., of that city, is promoting a combination of American valve manufacturers, and that among the companies it is proposed to include are the Chapman Valve Mfg. Co., the Ludlow Mfg. Co., of Troy, N. Y.; the R. D. Wood Co., of Philadelphia; the Pratt & Cady Co., of Hartford, Conn.; the Michigan Iron & Brass Co., of Detroit, and the Crane Co., of Chicago.

Westinghouse, Church, Kerr & Co., contracting engineers, sold to foreign countries during the first six weeks of this year machinery aggregating 1,770 h. p., as compared with 1,515 h. p. for the entire first half of 1898.

An important recent contract in equipment is that for the Third Avenue Railroad Co.'s power house at New York. It will be the largest power house ever planned, the equipment consisting of 16 units (engine and dynamo) of 3,000 kilowatts each. The power plant of the Metropolitan Traction is to have only 11 units. The total amount of the contract, exclusive of buildings, is about $5,000,000. The electrical machinery is to be furnished by the Westinghouse Electric & Mfg. Co. The engines to drive the generators will have an economic rating of 4,000 h. p. They are to be built by the Westinghoue Machine Co., and are to give the station the nominal rating of 64,000 h. p., or a maximum capacity of about 100,000 h. p.

The A. H. Nilson Machine Co., Bridgeport, Conn., manufacturer of automatic machinery for wire and sheet metal working, has remodeled its plant. The office and draughting rooms are now in front, formerly at the side. The alteration gives more light for the machine shop and more room for machinery, in addition to a large private room for machinery whose operation is not exhibited. The company has been kept busy on recent orders.

The Alabama Steel & Wire Co., Birmingham, Ala., has placed a contract with the Southwark Foundry & Machine Co., of Philadelphia, for a cross-compound engine of 1,500 h. p. for its rod mill. An additional contract just given to the Birmingham Machine & Foundry Co., of Birmingham, Ala., calls for a 1,500 h. p. tandem-compound Corliss engine for the company's wire mill. These contracts complete the power equipment of the new plant, giving a total of 8,500 h. p.

A contract has been made between the Bass Foundry & Machine Co., of Fort Wayne, Ind., and the Armour Packing Co., by which the largest stationary engine west of Chicago will be placed in the Armour plant in Kansas City. It will be a cross-compound condensing engine of 2,000 h. p., and will be placed in the central power plant at the packing house. Its cylinders will be 32 and 62 by 54.

The Hill Tool Co., of Anderson, Ind., has been organized with a capital of $9,000 by Hugh Hill, Earl Reeve and Wm. J. Jackson, to manufacture tools, tool holders and other specialties.

The Pennsylvania Railroad Co. has placed an order with the Baldwin Locomotive Works for 25 freight engines and has invited bids for 25 additional engines and about 3,000 miscellaneous cars. The increased traffic has created a demand for more motive power than the Altoona shops can supply.

Two steam shovels have just been sold by the Marion Steam Shovel Co., of Marion, O., for the Mesabi range—a Model K machine for the Biwabik mine and a Model G shovel for Gulbranson Bros. for stripping work. It is expected that three other Model G shovels will be placed at Mesabi mines in the coming month. The Marion Steam Shovel Co. has also sold within the past week 12 big steam shovels and a dredge for shipment to Russia. A number of other important contracts are about to be closed.

The interest of G. F. Danielson in the Toledo Machine & Tool Co., Toledo, O., has been purchased by E. W. Tolerton and Graff Acklin, the latter being general manager. Mr. Danielson is succeeded by J. L. Robinson as vice-president and by H. J. Hinde as director. Mr. Danielson has purchased the stamping department of the company and will operate it as an independent business.

The Lloyd-Booth Co., of Youngstown, O., has installed a new 15-ton Shaw electric crane.

We Have Heard it Said

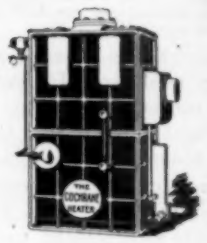
(By those who do not know) that our COCHRANE HEATERS and COCHRANE SEPARATORS are high priced. NOT SO—anything but high priced. May be you got the idea because we keep telling you how good they are—what good things we put in them. Like well built mince pies, they have a first-class casing and "INSIDES," which make them worth trying.

We don't make the cheapest heater on the market—can do it, but won't. Somebody has to decide what should go in a heater. Having 13 or 14 years of experience right in this line—we've decided—and there's no skimping.

No other heater can give hotter water and better purification—is more durable or easier to clean.

Did you ever clean a heater? Not an easy matter unless it's a "COCHRANE."

Shall be pleased to hear from you.



Harrison Safety Boiler Works, Col. Sta., Philadelphia, Pa.

Fires and Accidents:—

At Port Washington, Wis., Feb. 19, fire caused heavy loss to a number of plants. On the Western Malleable & Gray Iron Works the loss was $8,000.

Norman Bronson's machine shop, at Stillwater, Minn., burned with loss of $3,000; insurance, $1,200.

At Scranton, Pa., on Feb. 23, a flywheel in the blooming department of the south mill of the Lackawanna Iron & Steel Co, weighing 50 tons, and 60 feet in diameter, burst into fragments. The damage is $20,000. One workman was killed and several injured.

Merrill Bros.' machine shop at Brooklyn, N. Y., was destroyed by fire, Feb. 17. Loss $50,000.

The boiler works of S. J. Grimley, Pottstown, Pa., were burned, Feb. 18. Loss $4,000.

A fire in the foundry of Stewart & Mattison, at Philadelphia, caused a loss of $50,000.

Fire at the American Radiator Co.'s plant, at Titusville, Pa., Feb. 23, caused a loss of $35,000.

The Pittsburg District:—

The annual meeting of the shareholders of the Union Switch & Signal Co. will be held March 14. The report for the year ending Dec. 31, 1898, shows total sales of $654,536 33 and net earnings of $93,189 53. The total assets are $2,133,574 23, of which $1,000,000 is credited to patents, $375,000 to National Switch & Signal Co. capital stock. The liabilities include $1,495,550 of preferred and common stock, $409,000 of first and second mortgage bonds, $3,150 interest, $95,924.14 bills and accounts payable, and a surplus of $129,950.09.

It is announced that the interest of O. M. Hartzell in O. M. Hartzell & Co., of Pittsburg, commission merchants, and dealers in ores, metals, etc., was purchased Nov. 17, 1898, and that the business after Feb. 25, 1899, will be continued by Reed F. Blair and James F Blair, under the firm name of Reed F. Blair & Co., at rooms 716 and 717, Lewis Bldg.

The Shoenberger Steel Co. booked an order last week for 500 tons of tank plate to be delivered in the Netherlands. The price is said to have been in the neighborhood of 1.60c, Pittsburg. The company has done a considerable export business lately.

A $15,000 addition will be built to the splice bar mill of the Carnegie Steel Co., at Duquesne.

It is reported that a new seamless tube manufacturing enterprise is to be started by Pittsburg capital. H. G. Wasson, of the Park Bldg., Pittsburg, has conducted the negotiations, and has purchased eight acres on the river front at Beaver Falls. The old Duquesne Tube Works building, recently bid in by the Carnegie Co., has been bought and will be moved to Beaver Falls. The plant will have 40 machines and the tubes made will range from 1-6 inch to 6 inches external diameter. A machine shop, warehouse and power building will be erected.

The Pressed Steel Car Co. has just been awarded the contract for 1,000 steel freight cars for the Pennsylvania Railroad. This will give the Pennsylvania 3,000 steel cars. Each car will weigh about 35,000 pounds and will have a capacity of 110,000 pounds of iron ore or 106,000 pounds of coal. The Allegheny plant of the Pressed Steel Car Co. is working night and day, and about 3,000 men are employed. The Fox plant is running full on trucks.

The Iron City Tool Works, Ltd., Pittsburg, held a meeting last week at the Hotel Lincoln, most of the out of town stockholders being present.

The Riter-Conley Mfg. Co., Pittsburg, has a contract to furnish nine bridges, for the Pittsburg & Western road near Butler. These will be plate girder bridges, averaging about 80 feet span. The company also has the contract for the new buildings of the Pressed Steel Car Co.

The Chicago District:—

The building at 28 and 30 Market st., Chicago, known as the Lind Block, was destroyed by fire Feb. 23, the loss on the building being almost total. The building was occupied by a number of manufacturing concerns, including several machine shops and brass foundries. Among the concerns suffering from

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No. 2. " 5 "
No. 4. " 8 "
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"OTIS" FIRE-BOX PLATES A SPECIALTY.

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MONTREAL, Homer Taylor, 183 St. James St.
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Regenerative Gas Furnaces and Water Seal Gas Producers.

Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

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OAK HILL FIRE BRICK AND COAL CO.,
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the fire were the following: American Nickel Plating Works; Standard Enameling & Japan Works; Roth Bros., manufacturers of dynamos and electrical machinery; C. O. Malmgren, manufacturer of dies and models; H. Gunzer, machine shop; I. Larson, machine shop; Lippett & Franke, machine shop; Hartley Electrical Works; Bloomfeldt & Rapp, machine shop; Trigwell Bros. & Co., machine shop; August Nieman, machine shop; Anderson Bros., machine shop.

The Chicago Machinery Construction Co. has been incorporated at Chicago, with a capital stock of $25,000, to manufacture machinery and freight cars, by Harmon H. Friedley, Frederick C. Crowe and Philip L. Holmes.

In view of increasing business it has been found necessary to move the general offices of the Willard Sons & Bell Co. to the works at South Chicago, Ill. After March 1, all correspondence will go to that point.

The Chicago Pneumatic Tool Co., Chicago, has a report from John Macdonald & Son, of Glasgow, on an exhibition of the company's pneumatic tools held in Glasgow in Muir & Findlay's Parkhead Boiler Works. The tools seen at work by leading shipbuilders of the Clyde, railroad and locomotive builders and by a number of boiler makers and engineers were the Boyer hammer for chipping and calking, the Boyer riveting hammer, riveter with pipe frame, deck riveter and pneumatic holder-on, and casting cleaner. There were also shown the Whitelaw reversible drills and a chain hoist operated by air motor. The performance of all tools was highly satisfactory. The Whitelaw No. 8 drill tapped a 2½-inch stay tube hole through both plates of a marine boiler in 2½ minutes. The chain hoist, which weighs about 40 pounds, lifted 1,500 pounds. The Chicago Pneumatic Tool Co. has a letter from W. F. Dickson, chief engineer of the Sormovo Locomotive Co., in Russia, seeking to arrange for the sale of the company's specialties in Russia, in view of the good results attained with Boyer tools in the shops at Sormovo.

It is reported that the Illinois Steel Co. will erect a plant for the manufacture, on a considerably larger scale, of cement from blast furnace slag.

The W. D. Kent Co., of Chicago, has leased the foundry at 216 to 222 North Union st., formerly operated by the King & Andrews Co., and has removed its business to that location. The Kent company was formerly located on South Jefferson st., but found its plant inadequate to the needs of its growing business. The company has been established a long time, and is well and favorably known. It will undoubtedly meet with success in its new plant.

General Industrial Notes:—

It is announced that the machinery at the plant of the Indiana Wire Fence Co., Crawfordsville, Ind., will be removed to Anderson, Ind., and added to the equipment of the American Steel & Wire Co. plant at that point.

At the Republic Iron Works, Pittsburg, all the puddling furnaces are in operation and the number of heats to a turn has been increased from five to six.

At Duluth the final decree against the Duluth Iron & Steel Co. in favor of the Franklin Trust Co. has been filed and the trust company is now sole owner of the West Duluth blast furnace, its claim being $42,000.

Judgment was given at St. Louis against the Paddock-Hawley Iron Co., in favor of Chas. M. Turner, trustee of the White River Iron & Steel Co., for $3,393.58.

The Dillon-Griswold Wire Co., Sterling, Ill., have hitherto been running their works exclusively by water power from Rock River. The recent extreme cold has interfered with operations, and to guard against a repetition the company has installed three 250 h. p. Cahall boilers and two engines. The engines are 800 and 300 h. p. The company is also completing its rod mill, and expects to have it running early in March. It will have a daily capacity of 150 to 225 tons of wire

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SHENANGO VALLEY STEEL CO., New Castle, Pa.,

MANUFACTURERS OF

Tin Plate Bars, Steel Billets, Blooms and Bessemer Pig Iron.

rods, all of which will be drawn into wire in the company's own plant.

The Corning Steel Co., Chicago, will add two sheet mills and an annealing oven to the equipment of its works at Hammond, Ind., and will erect a new warehouse. The Lloyd Booth Co., Youngstown, O., will furnish the new mills.

The Grist & Graham limestone quarries near Carbon, Pa., have been sold to the Pennsylvania Limestone Co. The general office of the company will be locatd at New Castle, Pa. Geo. W. Johnston, of New Castle, and others are interested.

The Hilles & Jones Co., Wilmington, Del., which is erecting a new machine shop, will install a 40-ton electric traveling crane, and all modern appliances, used principally for erecting heavy tools such as punches, shears, bending and straightening rolls, and other heavy railroad and car shop machine tools.

The Bath Iron Works, Bath, Me., have 2¼ million dollars worth of work on their books. On the return of open weather the working force will be increased to 1,200 men.

At the Riverside Iron Works, Benwood, W. Va., plant the tonnage men have asked an advance of 10 per cent.

The Crane Iron Co. at Catasaqua, Pa., has advanced the wages of its 300 employes 10 per cent, to take effect March 1.

Official announcement is made of the first quarterly dividend of 1½ per cent on the preferred stock of the Federal Steel Co. It is reported that there have been earned already more than three quarterly dividends at the rate of 6 per cent on the preferred stock.

The Holly Mfg. Co., Lockport, N. Y., after conferring with its striking molders last week, agreed to pay $2.50 as a minimum rate to molders. It refused, however, to substitute molders for laborers on molding machines. If its offer were not accepted by Feb. 27 it reserved the right to withdraw that part of it referring to wages.

The Aetna-Standard Iron & Steel Co., of Bridgeport, O., made a shipment last week of 12 carloads of T-rails, consigned to Yokohama, Japan.

The Richmond Locomotive & Machine Works has received an order by cable for 20 compound locomotives for use on Swedish railroads.

Notice has been posted at all the plants of the Thomas Iron Co. advancing wages 10 per cent. This is the first order increasing wages that has been issued in the Lehigh Valley in several years.

Potts Bros. will increase puddlers' rates to $2.50 per ton in their mill at Pottstown, Pa., on April 1. At Sharon, Pa., the Buhl Steel Co. advanced the wages of laborers in the open-hearth department from $1.25 to $1.40 a day March 1.

The Rome Iron Co., Rome, Ga., has suspended. The liabilities are $150,000 and assets $100,000.

David Jameson, L. S. Hoyt, J. P. H. Cunningham and C. P. Byers, of New Castle, Pa., and H. S. Blott, of Ellwood City, have purchased the plant of the Derwent Foundry Co., at Ellwood City, Pa., and will manufacture bath tubs, sinks and other enameled goods.

The Aschman Steel Casting Co., Sharon, Pa., has advanced wages 10 per cent.

The furnace companies of the Mahoning and Shenango valleys, at a meeting held at Youngstown, O., Feb. 25, decided to restore the wages of all furnace employes to the

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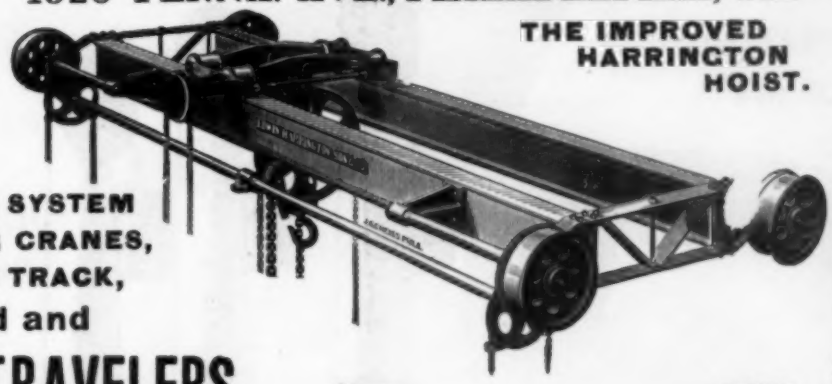

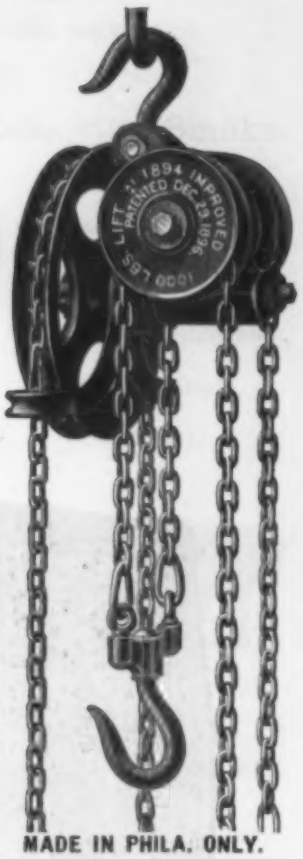

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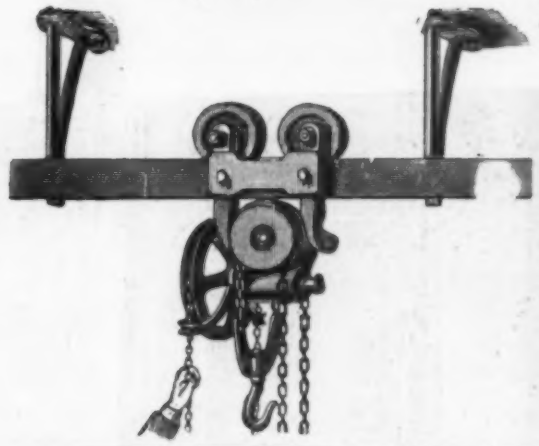

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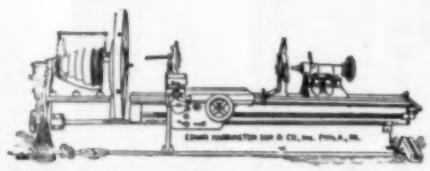

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figures of 1896. Under the restored scale the following daily wages will be paid: Laborers, $1.30; fillers, $1.65; fillers' helpers, $1.50; casting house helpers, $1.65; hot blast men, $1.65; keepers, $1.90; top fillers, $1.80; cindermen, $1.65. The increase is approximately 10 per cent.

The Great Western Tin Plate Works at Joliet, Ill., now owned by the American Tin Plate Co., and which were burned some months since, have been rebuilt and the hot mills were put in operation last week. The new building is entirely of steel. In rebuilding, the manufacturing facilities have been considerably improved but no additions have been made to the machinery, as these works are ample to meet the requirements of the trade which they serve.

The Lackawanna Iron & Steel Co. has declared a dividend of $50 per share and is calling for bids on the $1,200,000 5 and 6 per cent bonds outstanding on the Scranton plants. The balance of the proceeds of the sale of the company's Scranton coal lands is retained in the treasury. The surface rights of the lands have been retained, only the coal being sold.

The Ellis & Lessig Steel & Iron Co., Pottstown, Pa., has posted notice of an advance in puddlers' wages from $2.25 to $2.50 a ton on April 1. At the leased plant of the Glasgow Iron Co. an advance is to be made to $2.40.

The Tennessee Coal, Iron & Railroad Co.'s estimated net earnings in January were $79,337, against $69,309 in January, 1898. Fixed charges were $46,563, against $47,479 in January, 1898.

For Ella Furnace, at West Middlesex, Pa., a series of bins 1,200 feet long, for coke, ore and limestone, will be built by Taylor Bros., of Sharon, for Pickands, Mather & Co.

The report that ground will be broken in 30 days for two more blast furnaces at the Lorain Steel Co.'s plant, Lorain, O., is at least premature. Eventually other furnaces may be built at Lorain but there are no plans for immediate construction.

The E. & G. Brooke Iron Co., has posted notice at its plant at Birdsboro, Pa., of an increase of 25 cents a ton in the wages of puddlers, to go into effect April 1. The new rate will be $2.50 a ton.

The receiver of the Ohio Iron Co., at Zanesville, O., has been authorized to operate the blast furnace until Jan. 1, 1900.

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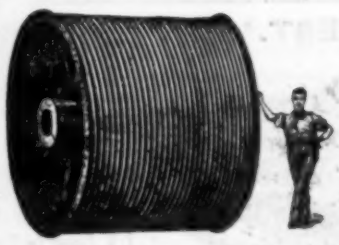

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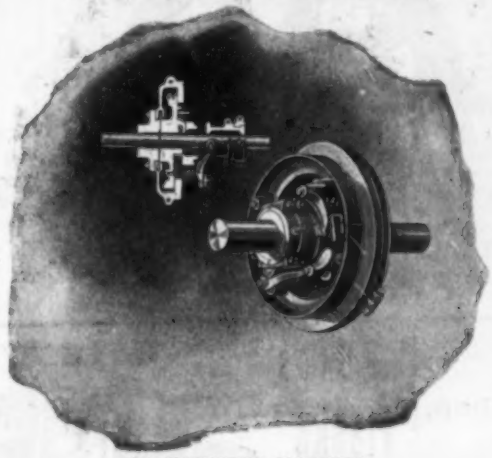

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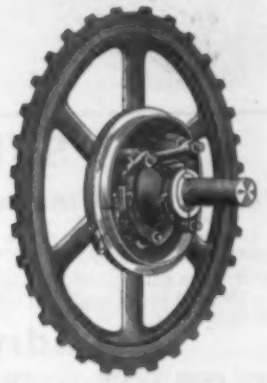

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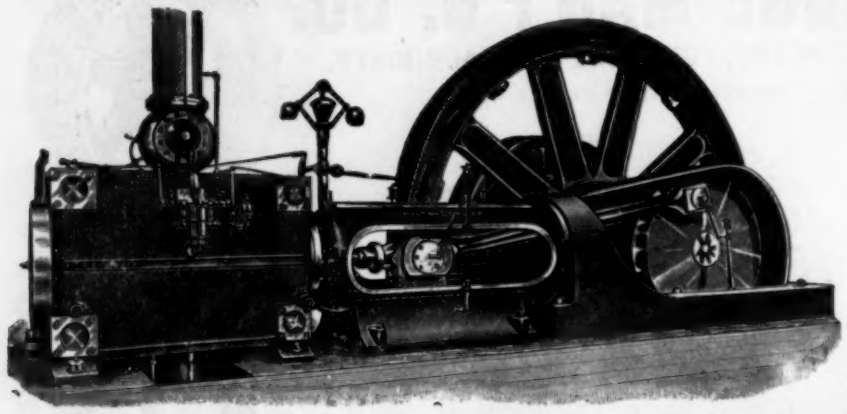

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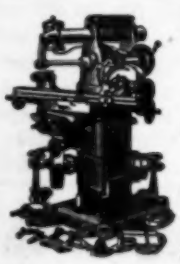

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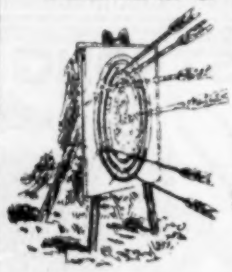

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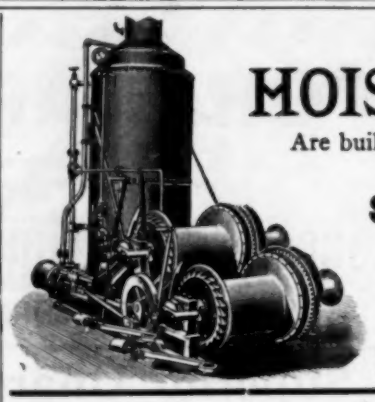

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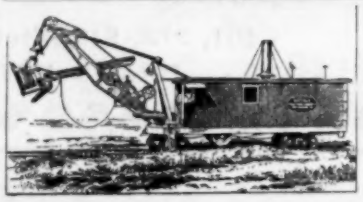

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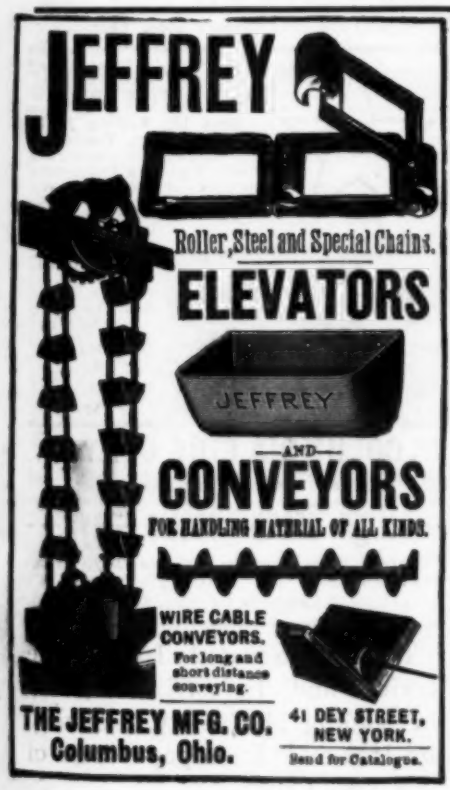

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The methods for analysis of iron ore, iron and steel and for assaying have been given briefly, but perhaps as much in detail as is consistent with the general scope of the book. Several changes and additions to the Specific Gravity tables have been made by adoption of later and more accurate values.

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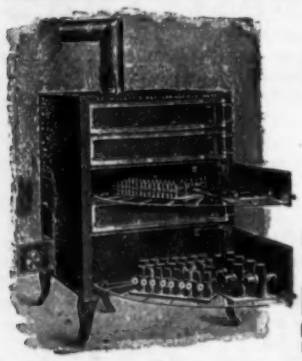

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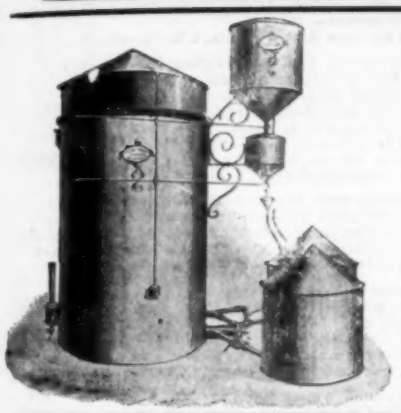

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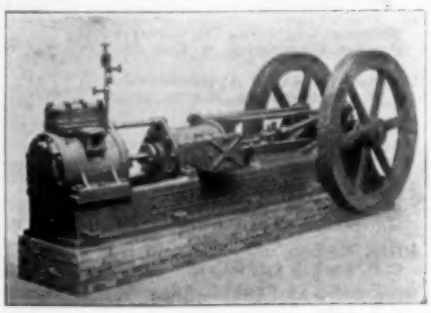

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Stilwell-Bierce & Smith-Vaile Co., Dayton O.
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Stilwell-Bierce & Smith-Vail Co., Dayton, O.
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Marion Steam Shovel Co., Marion, O.
The Bucyrus Co., South Milwaukee, Wis.

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Twist Drill Cases—
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A. H. Nilson Machine Co., Bridgeport, Conn.

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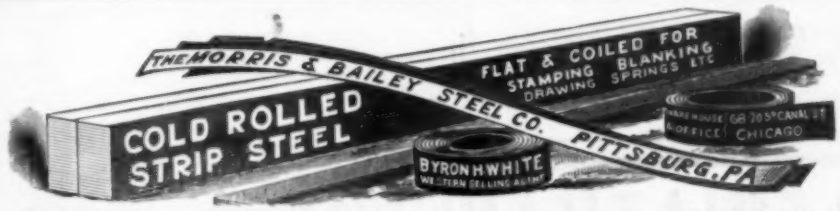
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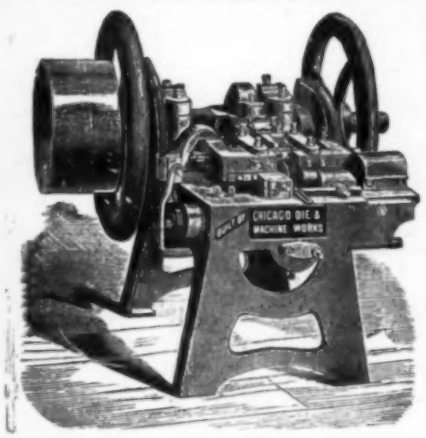
WAREHOUSE & OFFICE 68-70 S. CANAL ST. CHICAGO

BYRON H. WHITE, Western Selling Agent, CHICAGO.



CHICAGO DIE AND MACHINE WORKS
MANUFACTURERS OF
Bolt Forging Machines
NUT TAPPERS, IRON CUTTERS,
Power, Screw and Lever Presses, Dies.
Furnaces for Heating Ends of Iron for Bolts.
SPECIAL MACHINERY
87 to 91 West Lake St., Chicago.

Don't Waste Money in Your Pattern Shop.
THE GOBEILLE PATTERN CO., Cleveland.

Between the Lakes and the Gulf, the Mississippi and the Allegheny Mountains—the best buying section of the United States—is the BULK of THE IRON TRADE REVIEW'S circulation. In this section advertisers in all trade papers get best returns.

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

Special low-phosphorus hard Ore, Bessemer	3.65
No. 1 Specular, Bessemer	3.01@3.35
No. 1 Bessemer hematite	2.75@3.15
Hematites No. 1 non-Bessemer	1.90@2.10
No 1. Specular, non-Bessemer	2.00@2.40
Mesabi Bessemer	1.80@2.00

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	13 15
No. 1 Strong Foundry	13 00@13 25
No. 2 Strong Foundry	12 50@12 75
Gray Forge, red short	12 65
Gray Forge, neutral	12 50
No. 1 American Scotch	13 15
No. 2 American Scotch	12 65
Lake Superior Charcoal	14 00@15 00
PITTSBURG:	
No. 1 Foundry	$13 00@14 00
No. 2 Foundry	12 50@12 65
Gray Forge	12 50@12 65
White and Mottled	9 50
Warm Blast Charcoal	13 00@13 50
Cold Blast Charcoal	22 00@26 00
Bessemer	12 75
CHICAGO:	
Lake Superior Charcoal	$14 00@$16 00
Local Coke Foundry No. 1	13 50@14 00
Local Coke Foundry No. 2	13 00@13 50
Local Coke Foundry No. 3	12 50@13 00
Local Scotch Foundry No. 1	13 50@14 00
Local Scotch Foundry No. 2	13 00@13 50
Local Scotch Foundry No. 3	12 50@13 00
Southern Coke No. 1	14 00@14 25
Southern Coke No. 2	13 75@14 00
Southern Coke No. 3	13 25@13 75
Southern No. 1 Soft	14 00@14 25
Southern No. 2 Soft	13 75@14 00
Southern Silveries	14 00@14 25
Jackson Co. Silveries	13 50@14 00
Ohio Silveries No. 1	@
Ohio Strong Softeners	13 50@14 00
Alabama Car Wheel	16 50@16 75
Malleable Bessemer	13 50@14 00
Coke Bessemer	13 50@14 00
CINCINNATI (reported by Rogers, Brown & Co.	
Southern Coke No. 1, Foundry	$13 00@13 25
Southern Coke No. 2 and No. 1 Soft	12 50@13 75
Hanging Rock Coke, No 1	11 00
Hanging Rock Charcoal No. 1, Fdy	16 00@17 00
Tennessee Charcoal No 1	14 00@14 25
Jackson County Silvery No 1	13 25@13 50
Southern Coke, Gray Forge	11 50@11 75
" " Mottled	11 50@11 75
Standard Georgia Car Wheel	14 75@15 75
Tennessee " "	13 00@14 00
Lake Superior " "	14 25@14 50
BUFFALO:	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	
No. 2 Foundry Strong Coke Iron Lake Superior Ore	
Ohio Strong Softener No. 1	
Jackson Co. Silvery No. 1	
Lake Superior Charcoal	
Southern Soft No. 1	
" " No. 3	
ST. LOUIS:	
Southern Coke No 1	
Southern Coke No. 2	
Southern Coke No. 3	
Southern Gray Forge	
Southern Charcoal No. 1	
Missouri Bessemer	
Lake Superior Car Wheel	
Ohio Softeners	
Southern Car Wheel	

OLD RAILS AND SCRAP METAL.

[Delivered Cleveland.]	Gross Tons
Old iron rails	$15 00
Old steel rails (6 ft. and over)	10 50
Old steel rails (6 ft. and under)	10 50
Old car wheels	12 00
	Net Tons
No. 1 R. R. wrought scrap	$12 25
Mill scrap	9 75
No. 1 Machine cast scrap	9 00
Iron axles	16 25
Axle turnings	8 00
Wrought turnings (free from cast)	7 50
Cast borings	5 50
Uncut wrought iron boilers	5 00
Steel boiler plates	8 00
Grate bars	6 50
Pipes and flues (clean)	8 10
Tank iron	9 00
Hoop and band iron	7 50
Sheet iron	6 00
Wrought drillings	7 50
Malleable iron	8 50

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. Cleveland)	1.50c
Angles	1.40c
Tees	1.50c
Universal Plates	1.80@1.90c
Sheared Plates	1.90c

MERCHANT IRON AND STEEL.

[Less than car-lots, Cleveland.]

Rounds and Squares.—Bar Iron.

1 to 1⅞	1.05 Base.
2 to 2⅝	.20 extra.
3 to 3⅝	.50 "
3⅝ to 4	.80 "
4⅛ to 4⅝	1.00 "
4⅝ to 5	1.30 "
5⅛ to 6	1.50@2.00 "
5⅛ to 6⅜	2.00 "

VITRIFIED EMERY AND CORUNDUM WHEELS. . .

FOR

Foundry and Machine Shop Work.

CAN BE RUN WET OR DRY.

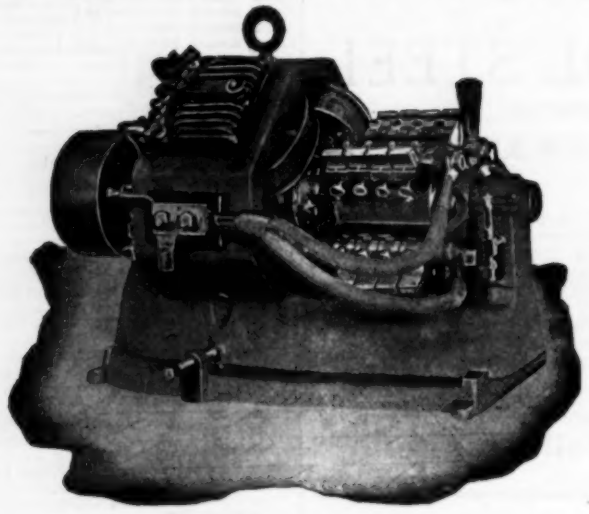
SOLD BY
Weed & Co., Buffalo, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Machinist Supply Co., Chicago, Ill.
Sligo Iron Store Co., St. Louis, Mo.

VITRIFIED EMERY WHEEL CO.,
Westfield, Mass.

Eddy Dynamo Electro-Plating Machines

FOR

BICYCLE PLATING PLANTS.



NORTHAMPTON EMERY WHEEL CO., 20 S. Canal St., Chicago, Ill.

EXCLUSIVE WESTERN SELLING AGENTS.

Weddell House.

Cleveland, Ohio.

THE U.S. HOTEL CO.
C. A. SWAN & W. L. BATES
MANAGERS

50 ROOMS AT $2.00
50 ROOMS AT 2.50
75 ROOMS AT 3 TO 4.00

All Meals 50¢ Each

LEVIATHAN

Leviathan Belting

Is the strongest, runs the most evenly, and best adapted for Cotton, Woolen, Saw and Planing Mills, Brick and Tile Works and

Heavy Driving Generally.

MAIN BELTING CO.

1219-1235 Carpenter Street,
PHILADELPHIA.

120 Pearl Street,
BOSTON.

55 & 57 Market St.,
CHICAGO.

Metallurgy of Cast Iron, Price $3.00.

6⅝ to 7¼	2.50 extra
¼ to ⅜	.10 "
⅜ to 11-16	.20 "
½ to 9-16	.30 "
7-16 to 15-32	.40 "
⅜ to 13-32	.40 "
5-16 to 11-32	.50 "
¼ to 9-32	.70 "
7-32	.90 "
3-16	1.40 "

Flats.—Bar Iron.

1⅛ to 4 x ⅜ to 1	1.05 Base
4¼ o 6 x ⅜ to 1	.10 extra
6¼ o 8 x ⅜ to 1	.60 "
8¼ o 10 x ⅜ to 1	.80 "
1⅛ o 4 x 1 1-16 to 1⅜	.30 "
4¼ to 6 x 1 1-16 to 1⅜	.40 "
6¼ to 8 x 1 1-16 to 1⅜	.60 "
8¼ to 10 x 1 1-16 to 1⅜	.90 "
2 to 4 x 1⅜ to 2	.50 "
4¼ to 6 x 1⅜ to 2	.60 "
6¼ to 8 x 1⅜ to 2	.80 "
8¼ to 10 x 1⅜ to 2	1.00 "
2 to 4 x 2⅜ to 3	.60 "
4¼ to 6 x 2⅜ to 3	.80 "
6¼ to 8 x 2⅜ to 3	1.00 "
1⅜ to 1⅜ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ½	.20 "
¾ to 15-16 x ⅜ to ½	.40 "
⅝ to 11-16 x ⅜ to ½	.50 "
½ to 9-16 x ⅜ to ½	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1⅛ to 4 x ¼ to 5-16	.20 "
1 to 1¾ x ¼ to 5-16	.30 "
¾ to 15-16 x ¼ to 5-16	.50 "
⅝ to 11-16 x ¼ to 5-16	.80 "
½ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1-10 c. per lb. higher than ¼ to 5-16 thick. Bevel Edge Shaft Iron 1-10 higher than same size of Heavy Bands.

Light Band Iron.

7 to 8 x No. 9 to 3-16	.90 extra
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¾ to 4 x No. 9 to 3-16	.40 "
1¾ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	.60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40
⅜ x No. 9 to 3-16	1.50
⅜ x Nos. 10, 11 and 12	1.60

Bevel Edge Box Iron.

Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in.

Sand Band Iron, 1-10 c. above same sizes o Light Bands.

Oval Iron.

⅜ to 1⅛	.40 extra.
¾ to 13-16	.50 "
⅝ to 11-16	.60 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
⅛ to 9-16 x 3-16	1.00 "
⅜ to 11-16 x ⅛	1.20 "

Half Oval and Half Round.

2¼ to 3	.60 extra
⅞ to 2	.50 "
¼ to 13-16	.70 "
⅝ to 11-16	.90 "
½ to 9-16	1.20 "
⅜ to 7-16	2.50 "
5-16	3.50 "
¼	4.50 "

Half Ovals less than ¼ their width in thickness, extra price.

Horse Shoe Iron.

All sizes 1 c. extra.

Cutting ordinary bars to specified length, .20 to .30 extra, according to length and size.

Steel Bands.

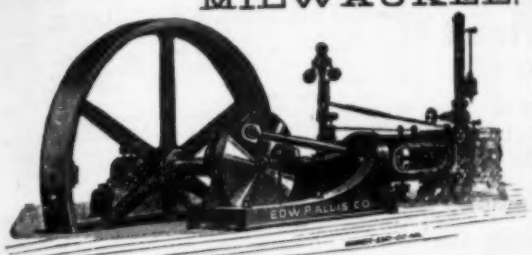
Width In Inches.	English Standard Gauge.		
1 1-2 to 6,	Nos. 7, 8, 9 or 3-16 "	1.50	Base.
		Extras.	
1¼ to 6,	" 10, 11, 12 or 1/4"	.05	per 100 lbs.
1 to 1¾,	" 7, 8, 9 or 3-16"	.10	"
1 to 1¾,	" 10, 11, 12 or ¼"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or ¼"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10, 11, 12 or ¼"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10, 11, 12 or ¼"	.45	"
½, Nos.	7, 8, 9 or 3-16"	.55	"
½, "	10, 11, 12 or ¼"	.60	"
7-16 "	7, 8, 9 or 3-16"	.75	"
7-19 "	10, 11, 12 or ¼"	.85	"
⅜, "	7, 8, 9 or 3-16"	.95	"
⅜, "	10, 11, 12 or ¼"	1.05	"

Iron and Steel Hoops.

Width Inches.	English Standard Gauge.		
7-16 to 3	Nos. 13, 14, 15 and 16	1.60	Base
		Extras.	
7-16 to 2,	" 17, 18, and 19	.05	per 100 lb
7-16 to 2,	" 20	.10	"
7-16 to 2,	" 21	.15	"
7-16 to 1¾,	" 22	.25	"
¼ to 1¾,	" 13, 14 and 15	.05	"
¼ to 1¾,	" 16, 17 and 18	.10	"

THE EDWARD P. ALLIS COMPANY

MILWAUKEE, WIS.



MANUFACTURERS OF

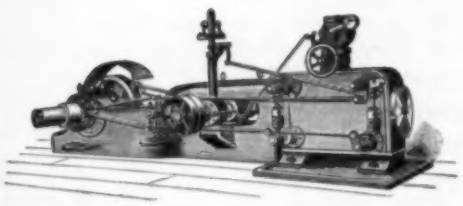
Blowing Engines, Hoisting Engines, Pumping Engines Air Compressors, Special Engines for Electric Lighting Street Railways and Rolling Mills. Ore Crushers, Crushing Rolls, Stamp Mills Concentrators, General Mining Milling and Smelting Machinery.

Reynolds Corliss Engines.

NEW YORK. CHICAGO. MINNEAPOLIS. DENVER. BUTTE. CITY OF MEXICO. SAN FRANCISCO. PITTSBURG.

THE LANE & BODLEY CO.,

CINCINNATI, OHIO.



Engines,

ALL SIZES.

Simple and Compound.

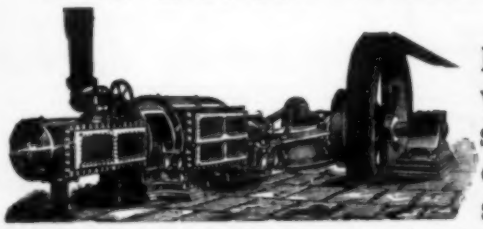
Shafting, Hangers, Pullevs.

Belt Elevators, Saw Mills.

WILLIAM TOD & CO.

YOUNGSTOWN, OHIO.

The Porter-Hamilton Engine



Reversing Engines, Blowing Engines, Converters, Hydraulic and special heavy machinery for the iron and steel trades.

Williams Improved Vertical Engines

For Direct Electrical and all High Class Work.

39-41 Cortland St., N. Y. E. F. WILLIAMS.

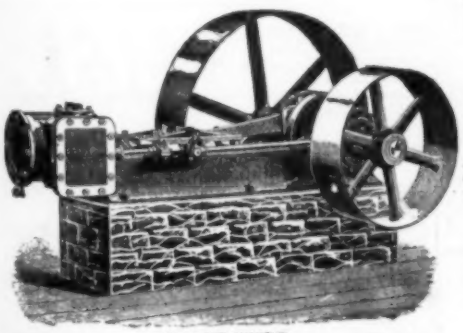
Park Building, Pittsburg, SEWARD S. BABBITT.

Who builds the best Mine Pump?

PRESCOTT.

Fred. M. Prescott Steam Pump Co.,

MILWAUKEE, WIS.



SENNETT ENGINE.

THE GEO. B. SENNETT CO.,

YOUNGSTOWN, OHIO,

MANUFACTURERS OF THE

Sennett Slide Valve Engine.

A well made and durable center crank engine of from 20 to 40 h. p. The design is thoroughly modern and all parts are made in duplicate Engines kept in stock ready to run. Catalogues or prices willingly furnished. Among our other specialties are the

Sennett Compressed Couplings.

(See advertisement next week.)

Foundry contracts solicited for Castings from 10 lbs. to 5 tons each.

1⅛ to 1⅜,	"	19 and 20	per 100 lbs.
1⅛ to 1⅜,	"	21	.20 "
1⅛ to 1⅜,	"	22	.30 "
15-16 and 1,	"	13, 14 and 15	.10 "
15-16 and 1,	"	16, 17 and 18	.15 "
15-16 and 1,	"	19 and 20	.20 "
15-16 and 1,	"	21	.25 "
15-16 and 1,	"	22	.35 "
⅞,	Nos. 13, 14 and 15		.20 "
⅞,	" 16, 17 and 18		.25 "
⅞,	" 19 and 20		.30 "
⅞,	" 21		.35 "
⅞,	" 22		.45 "
¾ and 13-16	Nos. 13, 14 and 15		.30 "
¾ and 13-16	" 16, 17 and 18		.35 "
¾ and 13-16	" 19 and 20		.40 "
¾ and 13-16	" 21		.45 "
¾ and 13-16	" 22		.50 "
¾ and 13-16	" 23		.60 "
11-16,	Nos. 13, 14 and 15		.35 "
11-16,	" 16, 17 and 18		.40 "
11-16,	" 19 and 20		.50 "
11-16,	" 21		.60 "
11-16,	" 22		.70 "
11-16,	" 23		.80 "
⅝,	Nos. 13, 14 and 15		.40 "
⅝,	" 16, 17 and 18		.45 "
⅝,	" 19 and 20		.55 "
⅝,	" 21		.65 "
⅝,	" 22		.75 "
⅝,	" 23		.85 "
9-16,	" 13, 14 and 15		.45 "
9-16,	" 16, 17 and 18		.50 "
9-16,	" 19 and 20		.60 "
9-16,	" 21		.70 "
9-16,	" 22		.80 "
9-16,	" 23		.90 "
½,	" 13, 14 and 15		.55 "
½,	" 16, 17 and 18		.60 "
½,	" 19 and 20		.70 "
½,	" 21		.80 "
½,	" 22		.90 "
½,	" 23		1.00 "
7-16,	" 13, 14 and 15		.80 "
7-16,	" 16, 17 and 18		.90 "
7-16,	" 19 and 20		1.00 "
⅜,	" 13, 14 and 15		1.00 "
⅜,	" 16, 17 and 18		1.10 "
⅜,	" 19 and 20		1.20 "

Sheet Iron.

No. 10	1 50
No. 12	1 70
No. 14	1 60
No. 15-17	1 75
No. 18	1 85
No. 20	2 00
No. 22-24	2
No. 25-26	2 20
No. 27	2 30

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 35
Shell	1 45
Flange	1 55
Marine Flange	1 60
Fire Box	2 05

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. B. extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special.

Flats. cts. lbs.

2 to 9-16 in. wide by 2 to ⅝ thick ..... .08

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

American Cast Tool Steel.

ROUND, SQUARE, AND OCTAGON. cts. lbs.

1 to 2 in. inclusive	.08
9-16 to ⅞ in. "	.08
7-16 to ⅜ and 2⅜ to 3 in	.09
3⅛ to 4 in	.09½
⅜ to 11-16 and 4⅜	.10
⅝ to 6 in	.10½
¼ to 9-32 and 6⅝ to 7 in	.11
1 in	.13

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 00
Bridge ½, ⅝, 11-16 and ¾ inch diam	2 55

Wrought Pipe and Boiler Tubes.

Lap weld black, base, and 10 per cent				78
Butt " " "				72
Lap " galv.	"			70
Butt " " "	"			67
Boiler tubes 2¼" and smaller				72½
Boiler tubes 2½" and larger				72
Casting screw and socket joint				dis. 50
Casing inserted joint				dis. 45

MACHINERY SUPPLY MARKET.

[From Store, Cleveland.]

Anti-Friction Metals.

Magnolia Anti-Friction Metal, 25 cts. per lb., f. o. b. New York or Chicago.

No Name Metal, 15 cts. per lb., f. o. b. New York or Chicago.

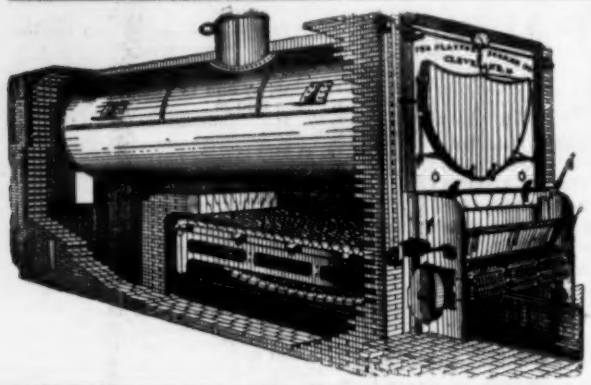
Mystic Metal. 10 cts. per lb., f. o. b. New York or Chicago.

Anvils.

American	₩ lb 9@11
Wright's	₩ lb 12

Bellows.

Blacksmiths'	Hill's	dis
	Bullock's	dis 50 & 1
Moulders'		dis 40@40&10
Hand		dis 40&10@50



The Playford Mechanical Stoker

Guaranteed to

Abolish smoke, to increase boiler capacity and to save fuel.

For information, address,

The Playford Stoker Co.,

404 Telephone Bldg.,

CLEVELAND, O.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.

CLEVELAND. OHIO.

ORDER DIRECT FROM THE

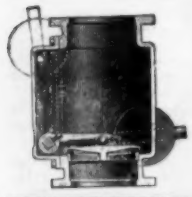
Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.



Excelsior Straight-Way Back Pressure Valve.

This valve has no dash pots, springs, guides or complicated levers to get out of order. It is simple, reliable and well made Never sticks, and can be relied upon at all times when using exhaust steam for heating; or when used as a relief, or free exhaust on a condensing plant, it has no equal. It is noiseless and free from any complicated attachments.

JENKINS BROTHERS, NEW YORK, PHILADELPHIA, BOSTON, CHICAGO.

Dixon's Pure Flake Graphite

Is a Blessing to Every Engine Room and Machine Shop.

A small quantity added to any Oil or Grease largely increases its lubricating value and makes the finest Cooling Mixture.

Pamphlet and Sample Sent Free.

JOS. DIXON CRUCIBLE CO., Jersey City, N. J.

FOR GREAT TENSILE STRENGTH, ELASTICITY AND ELONGATION, COUPLED WITH UNUSUAL NON-CORROSIVE QUALITIES,

Castings and Propeller Wheels

MADE FROM

PARSONS MANGANESE BRONZE

CANNOT BE EXCELLED. WRITE FOR PARTICULARS.

SOLE MAKERS,

THE WILLIAM CRAMP & SONS

Ship and Engine Building Company,

PHILADELPHIA, PA.

A paper that is paid for and read—THE IRON TRADE REVIEW.

Belting.

Boston Belting Co.'s standard	dis 70 & 10
" " " extra	dis 60&10
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 50
Shults Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shults Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 33⅓
Horton's Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 45
Sweetland "	dis 40
Almond Drill	dis 40
Morse "	dis 20
Skinner's Combination Lathe	dis 40&15
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 30

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 10 to 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	₩ 3½
Iron, steel points	₩ lb 1

Drill and Drill Sockets.

Twist Drills	
Morse Taper&Straight Shank to 1½"	dis 50&10 to 60
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 60@60&5
Cleveland " "	dis 60@60&5

Emery.

	No. 4 to No. 54 to Flour, C. F 46 gr.	150 gr.	F. F
Kegs, ₩ lb	4½c	5 c	2½c
½ kegs ₩ lb	4¾c	5⅛c	2⅝c
⅕ kegs ₩ lb	5 c	5½c	3 c
10 ₩ cans, 10 in case	6 c	6½c	c
10 lb cans less than 10	10 c	10 c	½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Crant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 50
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 2
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 55
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	10c
" " " " over 5 lbs	8c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5⅝	4½	4	3½	3⅛
Hexagon	15⅝	11⅝	8⅛	6	5⅛	5⅛	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

Standard Penny Nails, ₩ keg, base.

Car lots	$1.30
Less than car lots	$1.4

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz	dis 10@10&15

Picks.

Railroads, 5 to 6 lbs	dis $12 60
" 6 to 7 lbs	dis $13 60

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Rivets.

Iron, Thousand, list November 1, 1894	dis 60@60
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&15

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

List, Apr. 9, 1894

Brass	dis 35c
Copper	dis 35c
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ lb dis 30

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Cleveland Press Special	†9:25 P M	†2:00 P M
Akron, Canton & Wheeling...	*10:20 A M	*3:30 P M
Akron, Canton & Chicago	*8:05 A M	*6:35 P M
Akron, Canton & Marietta,...	†2:10 P M	†11:00 A M
Pittsburg, Washington, D. C., & Baltimore	*11:30 A M	†2:00 P M
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Elyria Depot: Huron St., West Side.

South Bound.			Central Standard.		North Bound.	
15	13	11	Lorain Branch	12	14	16
P.M.	P.M.	A.M.	LV. AR.	A.M.	A M.	P.M.
4:25	2:25	6:27	Lorain	9:15	11:35	7:30
4:40	2:30	6:44	Elyria	9:00	11:21	7:16
4:56	2:55	7:04	Grafton	8:43	11:07	6:58
5:15	3:12	7:23	Lester	8:25	10:50	6:40
5	3	1	Main Line	2	4	6
5:30	2:25	7:20	Cleveland	8:30	11:50	7:15
5:47	2:41	7:36	Brooklyn	8:14	11:34	7:01
6:42	3:26	8:22	Lester	7:29	10:49	6:19
6:52	3:35	8:30	Medina	7:16	10:37	6:07
7:05	3:46	8:41	Chippewa La	7:04	10:26	5:55
7:20	4:01	8:56	Sterling	6:48	10:12	5:40
8:09	4:46	9:45	Massillon	6:00	9:23	4:54
8:55	5:31	10:34	Canal Dov r.	5:11	8:36	4:10
9:02	5:38	10:41	New Philade	5:04	8:28	4:03
9:20	6:05	11:25	Uhrichsville	4:45	8:10	3:45
.....	8:10	1:30	Bridgeport	.....	6:05	1:40
.....	8:25	.....	Bellaire	.....	5:50	.....
P.M.	P.M.	P.M.	AR. LV.	A.M.	A.M	P M.

No. 9 leaves Lorain 9:50 a.m., Elyria 10:05, Grafton 10:21; arrives Lester Junction 10:40. No. 10 leaves Lester Junction 3:25 p.m., Grafton 3:42, Elyria 3:57; arrive Lorain at 4:10 p.m.

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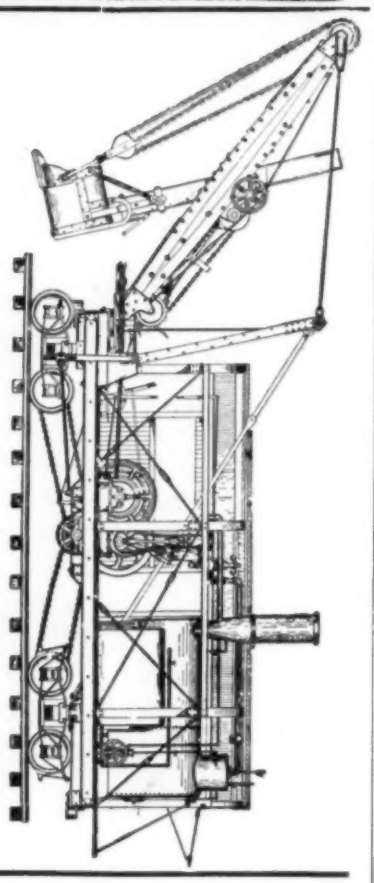

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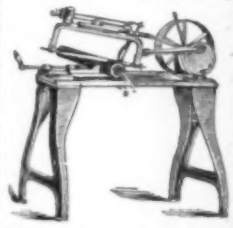

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